CORRELATION OF TREATMENT MODALITIES IN PATIENTS WITH EPISTAXIS AND ITS OUTCOMES

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Submitted By

DR LOVLEEN SANDHU

DEPARTMENT OF OTORHINOLARYNGOLOGY
DAYANAND MEDICAL COLLEGE AND HOSPITAL
LUDHIANA, PUNJAB

DECLARATION BY THE CANDIDATE

I hereby declare that the thesis entitled "**CORRELATION OF TREATMENT MODALITIES IN PATIENTS WITH EPISTAXIS AND ITS OUTCOMES**" submitted towards partial fulfillment of the requirements for the award of **MS in Otorhinolaryngology** degree to BFUHS is a compilation of original work carried out by me under the supervision of **Dr. Manish Munjal**, Professor & Head, Department of E.N.T, **Dr. Rohit Verma**, Professor, Department of E.N.T and **Dr. Sanjeev Puri**, Asst. Professor, Department of E.N.T. No part of this thesis has formed the basis for the award of any degree previously.

_____

Dr. LOVLEEN SANDHU
Department of Otorhinolaryngology,
Dayanand Medical College & Hospital,
Ludhiana, Punjab

Date:

Place:

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This is to certify that the work incorporated in this thesis entitled "**CORRELATION OF TREATMENT MODALITIES IN PATIENTS WITH EPISTAXIS AND ITS OUTCOMES**" has been carried out by **Dr. Lovleen Sandhu** under our direct supervision. The data incorporated in this thesis is original and genuine and has been carried out by the candidate herself.

Signature of Supervisor

Dr. Manish Munjal
Professor & Head
Department of E.N.T
DMC&H, Ludhiana

Signature of Co-Supervisors

Dr. Rohit Verma
Professor
Department of E.N.T
DMC&H, Ludhiana

Dr. Sanjeev Puri
Asst. Professor
Department of E.N.T
DMC&H, Ludhiana

Date:

ENDORSEMENT BY THE HEAD OF THE INSTITUTE

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Dr Lovleen Sandhu
Department of Otorhinolaryngology,
Dayanand Medical College & Hospital,
Ludhiana, Punjab - 141001

Date:

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Dedicated

to my

family,

friends

& teachers

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*"Gratitude is the fairest blossom which springs from the soul." - **Henry Ward Beecher**.*

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Dr. Lovleen Sandhu

ABBREVIATIONS

CAD	CORONARY ARTERY DISEASE
DBP	DIASTOLIC BLOOD PRESSURE
ESPAL	ENDOSCOPIC SPHENOPALATINE ARTERY LIGATION
F	FEMALE
FFP	FRESH FROZEN PLASMA
Hb	HAEMOGLOBIN
HTN	HYPERTENSION
INR	INTERNATIONAL NORMALISED RATIO
L	LEFT
M	MALE
N	NO
NP	NASAL PACKING
PRBC	PACKED RED BLOOD CELLS
PTI	PROTHROMBIN TIME
R	RIGHT
SBP	SYSTOLIC BLOOD PRESSURE
SC	SEPTAL CAUTERISATION
Y	YES

ABSTRACT

Introduction: Most anterior epistaxis originates primarily from the Kiesselbach's plexus, whereas posterior epistaxis is less common and originates from branches of the sphenopalatine artery. Risk factors include local trauma, foreign body insertion, substance abuse, neoplasms, inherited bleeding diatheses, or acquired coagulopathies. Modern-day management of epistaxis is a little more sophisticated, with the advent of new products, rigid endoscopes, improved surgical techniques, and arterial embolization. In this study, we adopted a single or sequential multiple modalities in order to control the epistaxis which include: septal cauterization, nasal packing and sphenopalatine artery ligation. The most preferred modality was chosen on the basis of control of bleed, requirement of any additional intervention, complications and any sequalae on follow ups.

Aim of Study:

1. To study the modality by which epistaxis is controlled.
2. To compare the efficacy of various modalities in control of epistaxis
3.

Materials & Methods: In this prospective study, patients presenting with epistaxis in out- patient clinics, inpatient department and emergency were included over the span of 1 year (September 2022 to September 2023). These patients were accordingly managed by either single modality or multiple modalities. Patients were followed up to 4 weeks with regular follow up on 7^{th} day, 14^{th} day and 1 month.

Clinical Significance: to study the blood supply of nose with detailed anatomy of sphenopalatine artery and different modalities adopted to control epistaxis, either posterior or anterior.

Results: In our study, most of the patients presenting with anterior epistaxis were treated with septal cauterization and those presenting with posterior epistaxis required sphenopalatine artery ligation. Posterior epistaxis mostly required sequential multiple modalities.

Conclusion: Epistaxis mostly affects the older age group, males and is seen in hypertensives. No correlation is seen with smoking, alcohol or diabetes. Sphenopalatine artery ligation should be the primary modality to control epistaxis with few failure rates and recurrences. Septal cauterization causes the most crusting on follow ups.

Keywords: epistaxis; endoscopic sphenopalatine artery ligation; nasal packing; surgical intervention; septal cauterization; posterior epistaxis; hypertension; cautery; nasal mucosa.

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INTRODUCTION

Warming and humidifying inhaled air is facilitated by the profuse vascularity of the nasal cavity. Sympathetic innervation causes the mucosa to shrink in size due to this underlying vasculature. The nose and nasal cavity are supplied by the branches of both external and internal carotid arteries.[1]

. The sphenopalatine and greater palatine arteries are distributaries of the internal maxillary artery, which is one of the terminal divisions of the external carotid artery.

. The anterior and posterior ethmoid arteries are distributaries of the ophthalmic artery which is the terminal division of the internal carotid artery supplying the septum.

. The anterior and posterior ethmoid arteries, respectively, supply anterosuperior and posterosuperior aspects of the nasal septum.

EPISTAXIS

Epistaxis terminology was first adopted in 1793. It is derived from the Greek word “epistazein” – epi means from above, stazein means to drip on. Thus, it is defined as bleeding from the nose. Clinically, the anatomic source of bleeding determines whether epistaxis is anterior or posterior.

Anterior Epistaxis:

Bleeding is anterior to the piriform aperture plane. This comprises bleeding from the mucocutaneous junction and vestibular skin, as well as frequent bleeding from the anterior septum. 80% and 90% of epistaxis occur from the anterior nasal septum, with Kiesselbach’s plexus being the primary site.[2]

Posterior Epistaxis:

Bleeding is from sites located posterior to the piriform aperture.

MANAGEMENT OF EPISTAXIS

Epistaxis anterior or posterior is managed in stepladder manner. Topical vasoconstrictors, digital nasal compression, spiral gauze or sponge tampon, monopolar cautery, diathermy, vessel ligation and embolization as the case may be.

AIMS & OBJECTIVES

PRIMARY AIM:

To study the modality by which epistaxis was controlled.

SECONDARY AIM:

To compare the efficacy of various modalities in control of epistaxis.

REVIEW OF LITERATURE

Epistaxis is rarely life threatening and usually resolves without intervention, though recurrences are not uncommon.

The entity epistaxis is reviewed from the following aspects:

I. Anatomical
II. Epidemiological
III. Pathophysiological
IV. Medical Therapeutic modality
V. Surgical Therapeutic modality
VI. Complications of therapeutic modalities

ANATOMICAL:

Blood supply of nose:

The external and internal carotid systems supply the nose, internally as well as externally.

Internal Carotid Artery (ICA):

The ophthalmic artery, the main division of internal carotid artery supplies the nasal cavity. It has three distributaries- the anterior ethmoidal artery, posterior ethmoidal artery, and the dorsal nasal artery. Lateral wall of nose and the anterior septum are vascularised by the anterior ethmoidal artery while the superior turbinate and the posterior septum are vascularised by the posterior ethmoidal artery. The dorsal nasal artery(one of the two terminal branches) arborizes on the dorsal aspect of the external nose.[3,4]

External Carotid Artery (ECA):

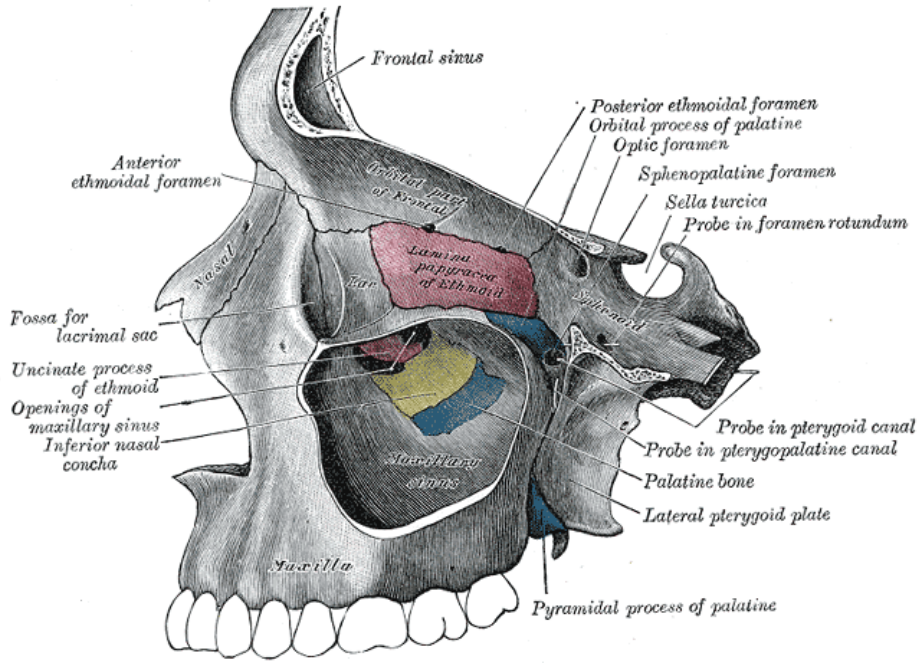
The external carotid gives two distributaries: the maxillary artery and the superficial temporal artery. The facial artery is the branch of the external carotid.

Internal Maxillary Artery:

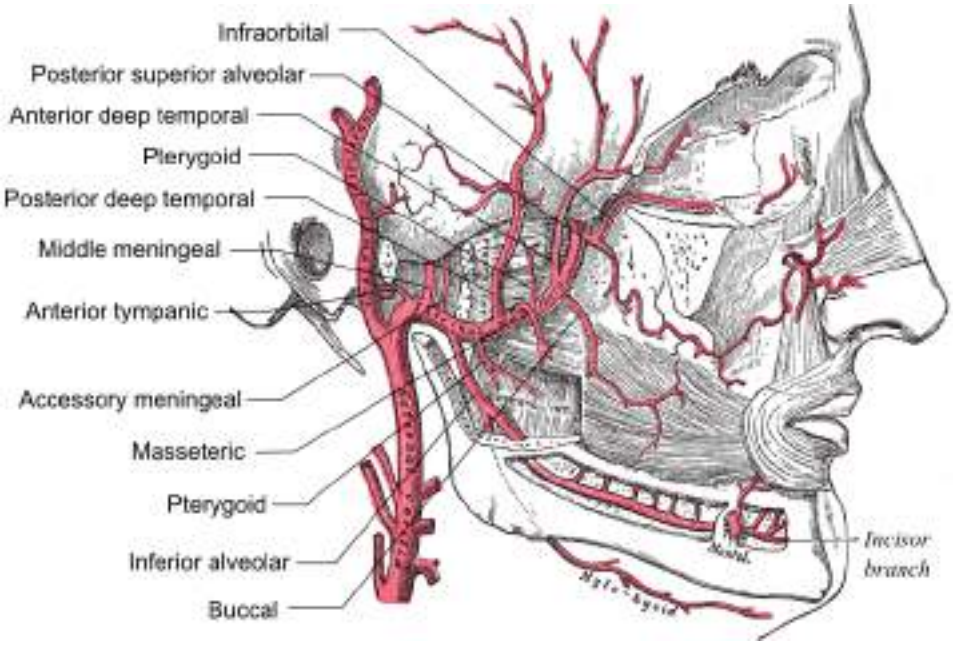
The internal maxillary artery inferiorly gives the descending palatine artery which traverses the pterygopalatine fossa to enter the palatine canal. This then terminates into the greater and lesser palatine arteries. The posterior aspect of the palate has the greater palatine foramen through which the greater palatine artery enters and traverses the palate anteriorly to finally reach the nasal cavity through the incisive canal. The septum and the floor of the nasal cavity is supplied by this artery.

The internal maxillary artery gives off another nearly horizontal oriented branch just like the descending palatine artery, the sphenopalatine artery. This artery takes origin in the pterygopalatine fossa from where it exits through the sphenopalatine foramen to enter the lateral wall of the nasal cavity. The foramen is located just posterior to the insertion of middle turbinate.

The sphenopalatine artery terminates into: the posterior lateral nasal and the posterior septal divisions. The middle and the inferior turbinates are supplied by the posterior lateral nasal artery, whereas the posterior septum is supplied by the posterior septal artery.[2,5,6]



Medial wall of left orbit. (Sphenopalatine foramen labelled in upper right.)[7]



Maxillary artery and its branches. ("Internal maxillary" is horizontal at left centre)[8]

Facial Artery:

The distributaries of facial artery in the nose are - the superior labial, the lateral nasal, and the angular artery.

- The superior labial artery gives an alar and a septal branch which supply the ala and the nasal septum respectively.
- The alar cartilage and the nasal vestibule are vascularised by the lateral nasal artery.
- The external tip of the nose, dorsum and the lateral wall of nose are supplied by the angular artery.[3,4,9]

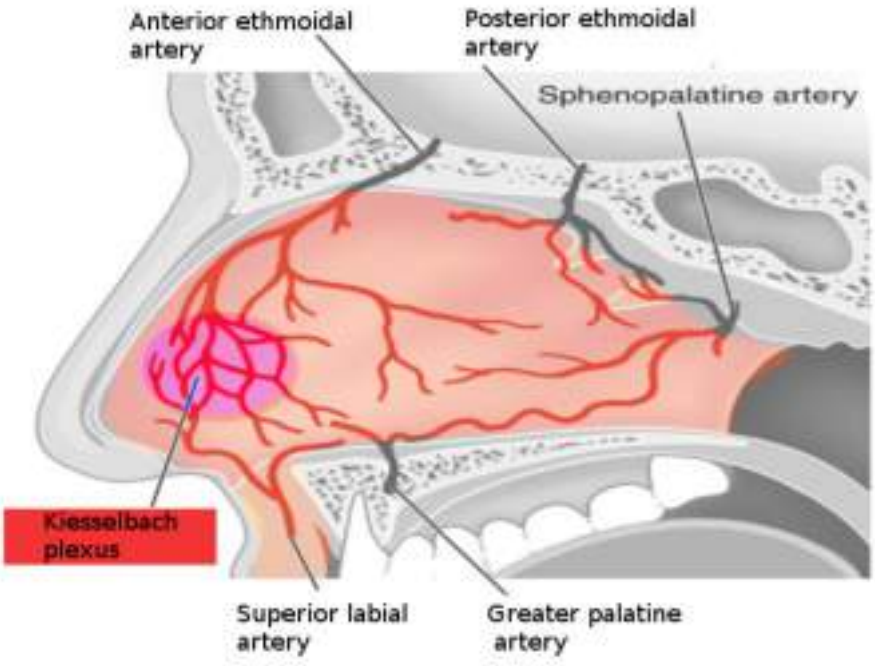
Kiesselbach's Plexus (Little's Area):

Kiesselbach's plexus is named after Wilhelm Kiesselbach (1839–1902), a German otolaryngologist who published a paper on the area in 1884. In 1879, American physician James Lawrence Little (1836–1885) elaborated on this region. The location was suggested by Little as "about half an inch", from the lower edge of the middle of the column [septum].

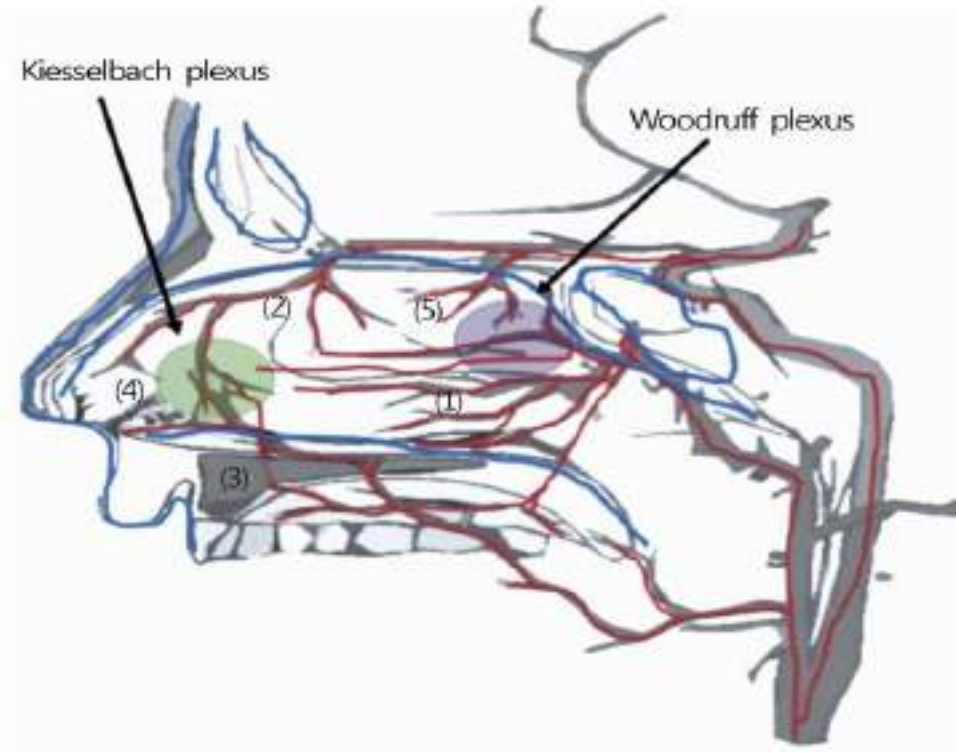
Kiesselbach's plexus or little's area is a vascular anastomosis between the five arteries that is - anterior ethmoid, superior labial, greater palatine, and the terminal branch of the posterior septal artery of the sphenopalatine artery. Located at the anterior nasal septum, this plexus is the most common site of epistaxis.[10]

Woodruff's Plexus:

The vascular anastomosis between the sphenopalatine artery and the ascending pharyngeal artery is known as "plexus of Woodruff". This plexus is present on the lateral wall of the nasal cavity, at the floor of inferior meatus.[11]



Arterial anatomy of medial and lateral nasal wall. Drawing of medial nasal wall shows blood supply of nasal septum. Note Kiesselbach's or Little's area, where most anterior epistaxis occurs.[12]



Blood supply of nasal cavity. (1) Sphenopalatine, (2) anterior ethmoidal, (3) greater palatine, (4) superior labial, and (5) posterior ethmoidal arteries.[13]

Venous Drainage:

The veins draining the external nose and nasal cavity, pair with the arteries and hence have similar nomenclature as that of the arteries. The pterygoid venous plexus located in the infratemporal fossa is drained by the branches of the maxillary vein. The facial vein has the tributaries of the veins of anterior nasal cavity. Consequent to this type of drainage, infections between the oral commissure and nasal bridge: “Danger area of face”, are likely to cause intracranial infections. Hence, these infections necessitate prompt treatment to prevent their extension to the brain.

Sphenopalatine Artery (SPA):

The sphenopalatine artery is the terminal branch of the internal maxillary artery in the pterygopalatine fossa and provides the main blood supply to the nasal cavity. The artery divides into two main branches within the pterygopalatine fossa: the posterior septal, and the posterior lateral nasal artery. The posterior septal supplies the septum whereas the posterior lateral nasal supplies the lateral wall of the nose. There are also several smaller branches.[14–18]

The septal branches of the anterior ethmoidal artery and the superior labial artery anastomose with the middle branch to form the Kiesselbach’s plexus, and the superior branch present, anastomoses with the posterior ethmoidal artery.[19] The greater palatine artery anastomoses with the inferior branch at the incisive canal.[19]

In 90% cases, in a study conducted by Lee et al.[20], the sphenopalatine foramen was located between the middle turbinate and the superior turbinate – mainly at the horizontal end of lamella posteriorly, present within the superior meatus.

A classification was proposed by Wareing et al.[21] They classified the sphenopalatine foramen as:

- Class I:

  Opening into the superior meatus only (35%),

- Class II:

  Spanning the ethmoidal crest with opening into both the superior and middle meati (56%),

- Class III:

  Having two distinct openings into the superior and middle meati (9%).

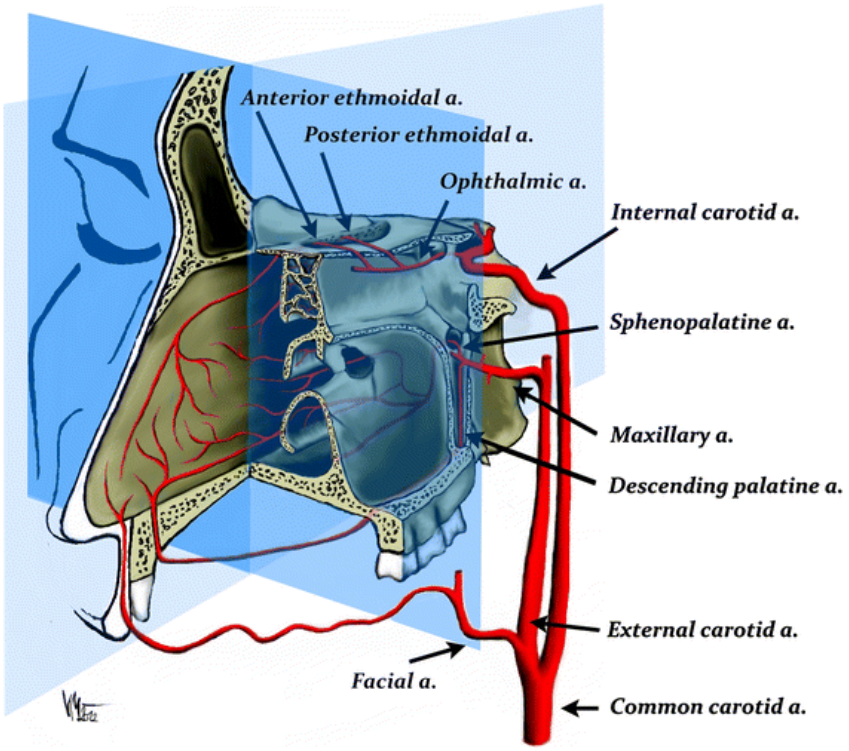
There is variation in the quantity of branches as well as where they branch off, either close or far from the sphenopalatine foramen.

According to Simmen et al.[15], 64% of sphenopalatine arteries had three or more branches before they entered the nasal cavity, and more than 97% of sphenopalatine arteries had more than one branch.

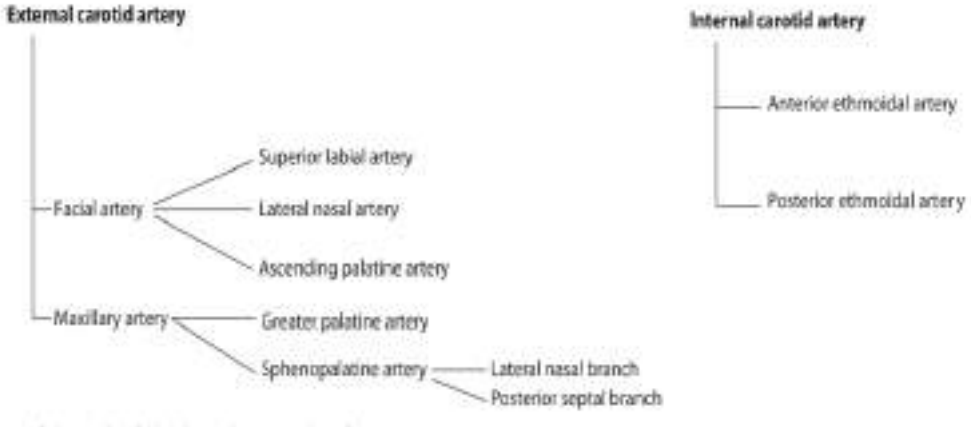
Padua et al.[22] reported that of the 122 nasal fossae removed, 67% had a single trunk and 21% had two trunks. According to Lee et al.[20] cadaver study, the sphenopalatine artery splits into two major branches in 76%, three in 22%, and four in 2%.

Babin[14] documented that the pterygopalatine fossa has a higher frequency of sphenopalatine artery divisions with respect to the nasal cavity.

Schwartzbauer[23] and Prades[16] both had comparable findings. However, their findings contradict those of Simmen et al.[15] who found three or more branches in 65% of specimens, and one with even ten branches.



Schematic arterial supply of the sinonasal cavity. The majority of the posterior epistaxis episodes arise from the septum. The arterial branches involved in epistaxis include the internal maxillary artery, the facial artery, and the ophthalmic artery (Courtesy of V. Machova)[24]



EPIDEMIOLOGICAL ASPECT

Epistaxis is accountable for almost one out of every 200 trips to the emergency room.[25] In the general population, the lifetime prevalence of epistaxis is thought to be around 60%, with only 6% of cases requiring medical attention.[26,27] Epistaxis predominantly affects people between the ages of 2 and 10 and 50 and 80, and it frequently occurs within a bimodal age distribution.[26] Peak incidence is shown in adults, 70 years of age and older, who are three times more likely than in paediatric patients.[25] Epistaxis can cause substantial morbidity even though it is rarely a direct cause of death, especially in the elderly and those with concomitant cardiovascular disease. Emergency providers frequently face management issues as a result of this illness.[28]

10% of people have experienced a major epistaxis at some point in their lives, according to statistics, while 30% of children between 0 to 5, 56% of those between 6 to 10, and 64% between 11-15 years have experienced at least one episode of epistaxis.[5] Furthermore, it has been shown that 56% of people with recurrent nosebleeds experienced issues during childhood.[26]

Barnes et al.[29] study documented that after sore throat, epistaxis is the second most frequent reason for emergency admission to ear, nose, and throat services. Over 21,000 casualty admissions were recorded in England in 2009–2010, with an average length of stay of 1.9 days. Maximum patients admitted were between the age of 60 and 70, though the age occurrence is bimodal, peaking earlier in childhood.

TYPES OF EPISTAXIS:

Epistaxis can be classified depending upon the site of bleed with respect to the piriform aperture into:**.** Anterior

. Posterior

- Anterior epistaxis results from bleeding from Kiesselbach's plexus. Anterior bleeding typically is from vessels which are easier to

compress, and vasoconstrict. Thus, they can be managed easily by topical therapy and electrocautery.[30] On the contrary, a posterior bleed accounts for about 10% of epistaxis events.[5, 26]

- Posterior epistaxis results from bleeding posterior to the pyriform aperture, usually from the sphenopalatine artery. Further, these bleeding sites are divided in the posterior nasal cavity into bleeding from the lateral wall, septum, and nasal floor. Mostly arterial in origin, difficult to localise and treat, and attain haemostasis.

Etiologically, epistaxis can even be divided into:

. Primary

. Secondary

- The primary epistaxis is frequently idiopathic and develops spontaneously without any clear inciting trauma. About 85% of all incidents are attributed to primary epistaxis.[26,31]
- The secondary has a known cause, such as anticoagulant therapy, trauma, postsurgical sequelae, vascular abnormalities, genetic or acquired coagulopathies, etc.

PATHOPHYSIOLOGICAL ASPECT

Conditions that alter the milieu interior of the nasal mucosa either by affecting the layers of the arteries or the coagulation status of the blood are likely to result in epistaxis.

The four primary causes are:

• **Environmental factors:**

Dry and cold weather can precipitate epistaxis, and hospital admissions are more in the winter season. Low ambient humidity in addition to interior heating system promotes evaporation of water from mucosal lining of the nose with consequent desiccation and thereby leads to nasal bleed.[32]

• **Local factors:**

i. Trauma:
   - Digital
   - Maxillofacial
   - Retained foreign bodies
   - Barotrauma
   - Illicit drug use (cocaine sniffers)

ii. Deviation of nasal septum

iii. Inflammatory:
   - Rhinosinusitis
   - Nasal polyps
   - Nasal diphtheria

iv. Neoplastic:
   - Juvenile angiofibroma
   - Nasopharyngeal carcinoma
   - Carcinoma of nose/paranasal sinuses

v. Postsurgical

vi. Direct trauma:
   - Passage of tubes:
     >Nasotracheal intubation
     >Nasogastric tubes

• **Systemic Factors**:

vii. Age:

The muscular tunica media of arteries during ageing process has been associated with epistaxis.[33]

viii. Hypertension:

Pre-existing hypertension can have chronic vascular damage. According to this theory, individuals with epistaxis and persistent hypertension experience significant episodes of nasal bleed as compared to the individuals with epistaxis and non-sustained hypertension. Moreover, there is evidence to support that "white coat hypertension," or anxiety-related hypertension, is roughly 20%.

ix. Alcohol:

Alcohol extends the bleeding time and reduces platelet aggregation. Moreover, alcohol induces haemodynamic changes such as vasodilation and blood pressure abnormalities which thereby precipitates epistaxis.

x. Bleeding diathesis:

Patients with thrombocytopenia, Von Willebrand's disease, and haemophilia have multiple episodes of nosebleeds consequent to aberrant coagulative function.[34] In Von Willebrand's disease, epistaxis is seen in 60% of individuals. In Hereditary haemorrhagic telangiectasia, epistaxis is not amenable to conventional therapeutic modalities. Atypical coagulation is observed in systemic conditions that induce thrombocytopenia or platelet abnormalities,

such as Human Immunodeficiency Virus, hepatic dysfunction, etc.

xi. Medications:

- Anticoagulation therapy:
  Warfarin, Dabigatran, Apixaban, Rivaroxaban,
- Antiplatelet therapy:
  Aspirin, Clopidogrel
- Nonsteroidal anti-inflammatory Intranasal medications:
  Ketorolac nasal spray

xii. Metabolic:

Hepatic dysfunction
Renal failure
Uremia
Alcoholism

In 85% of individuals, the etiology of epistaxis remains unknown.[35] Thornton et al.[36] 36 subject study of posterior epistaxis showed that 29 bled from lateral nasal wall and 7 from the nasal septum.

MEDICAL THERAPEUTIC MODALITY

Although rare, epistaxis may present as a life-threatening emergency.

AIRWAY:

Epistaxis leads to airway obstruction, more so in the elderly hypertensives, as well as in individuals with altered sensorium. Endangered airway necessitates basic and prompt advanced manoeuvres to retain its patency.

BREATHING:

Respiratory rate and character are vital in evaluation of epistaxis to obtain objective haemodynamic status and underlying respiratory compromise.

CIRCULATION:

Pulse, rhythm, character, and rate indicate the haemodynamic status and point to any underlying disorder. Sphygmomanometer assessment is vital for fluid resuscitation. Moreover, large-bore intravenous access is a prerequisite.

A full blood count determines the extent of the bleeding and a complete metabolic panel is essential to assess for any renal or hepatic dysfunction, as well as the breakdown products of ingested large volumes of blood.

FIRST AID:

Digital compression:

The anterior septum and the nasal alae require digital compression, utilising the thumb and the index finger.[34] Subjects may “self-compress” or need “assisted compression” at an appropriate site to achieve haemostasis. Consistent digital pressure is applied for ten to fifteen minutes.

Position of the head:

Holding the head flexed is advocated to avoid potential unpleasant and fatal haematemesis. The position is maintained for 15-20 minutes with external pressure on both nares to check the bleed – known as the “Trotter’s” or “The Hippocratic method.”

Nasal clips in lieu of manual nasal compression can be employed too to achieve hemostasis.[37] Vasoconstrictors, such as xylometazolines or oxymetazolines which are alpha- agonists, either as topical nasal sprays or soaked cotton pledges have wide utility.[26]

PATIENT HISTORY:

A detailed antecedent patient workup determines the underlying cause of epistaxis in a hemodynamically stable, non-respiratory distressed individual and dictates guide additional workup the therapeutic modality. Onset, sequence, laterality, volume, and prior trauma are crucial factors in case analysis.[38]

HEMATEMESIS OR HAEMOPTYSIS:

Profuse bleeding in the oropharynx, and bleeding from both nostril are possible symptoms in patients with posterior epistaxis.[26, 39]

Neoplastic, cardiothoracic, renal, hepatic, inherited coagulopathies and anatomical anomalies that may contribute to the development of epistaxis should all be taken into consideration.

Paul et al.[40] study observed 75% patients had elevated blood pressure during epistaxis of which 30% were classified as severe. 80% of the hypertensive patients who were monitored and evaluated using ambulatory blood pressure monitoring continued to have high blood pressure. Of these, 27% had no prior diagnosis for this illness.

SURGICAL THERAPEUTIC MODALITY:

- **CAUTERISATION:**

Cautery— electrical or chemical— has higher success with less pain with respect to anterior nasal packing.[30,41]

In bipolar electrocautery, thermal energy is applied to the region by radiation via an electrical circuit as opposed to direct contact. Depending on how far the chemical wave front that caused the burn penetrates, the affected tissue can be classified as:

i. Superficial partial thickness burn:
   Loss of surface epithelium without mucosal necrosis
ii. Deep partial thickness burn:
   Partial mucosal necrosis
iii. Full thickness burn:
   Full thickness necrosis reaching the perichondrium

Since the mucosa has superficial bleeding arteries, a deep partial thickness is required for a successful cauterisation.

Cautery application for 4-5 seconds is undertaken in a centripetal i.e. a peripheral to central manner which will result in an eschar or grey residue. Precise localisation of the haemorrhaging site and adequate illumination is essential for a successful outcome.

In the Bastianpillai et al[42] study involving bipolar diathermy, two treatments resulted in superficial half thickness burns (both lasting two seconds), and one application generated a full thickness burn (suggested to take six seconds). Six further treatments resulted in a deep partial thickness burn. At 8 Watts, two samples experienced full thickness burns at six seconds, three samples experienced deep partial thickness burns at four seconds, and all three samples had superficial partial thickness burns at two seconds. At six seconds, there was a deep partial thickness burn on one of the

samples. Eight of the nine tests at 10 W resulted in a full thickness burn, while one deep partial thickness burn occurred at 4 seconds.

This study accounted for the variability in the power settings utilized for bipolar electrocautery. It's interesting to note that 43.8% of respondents acknowledged using a bipolar electrocautery power of 10 W or higher; in their investigation, full thickness burns were consistently produced at this power level. Given the lack of clinical evidence, the danger of consequences is speculative in actual terms, but their statistics suggest the use of power of 8 W or less.

With 42.9% of responders using bipolar electrocautery for two seconds, the contact time is more consistent and may reduce some of the risk. The absence of conclusive guidelines or corroborating research is probably the cause of the variation in practice.

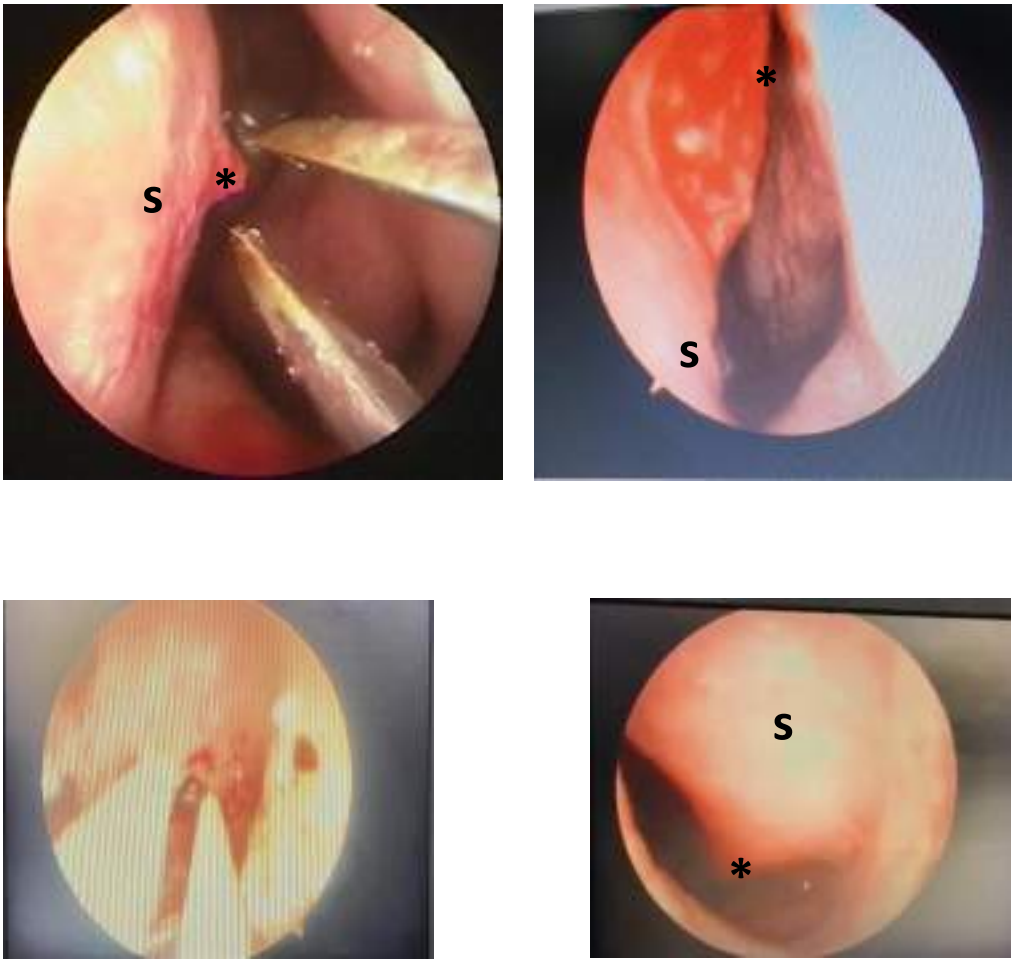
Lloyd et al.[43] histological analysis revealed that on silver cautery, the length of exposure had no bearing on the depth of penetration. Moreover, although the chemical application occurred instantaneously, there was no histological damage to the integrity of the cartilage. There was smudging of the chondrocytic nuclei suggesting early chondrocyte injury with late cartilage loss.

In tonsillar tissue, Hanif et al.[44] documented that penetration depth remained constant on using 75% silver nitrate for 5 to 20 seconds.

On the contrary, application for 5 seconds, a 95% concentration went twice as deep as a 75% concentration. Amin et al.[45] study concluded likelihood of more risks associated with this concentration.

In their assessment of different concentrations of silver nitrate used in children with idiopathic epistaxis, Glynn et al.[46] found that 75% solution was more effective than 95% silver nitrate in terms of complete resolution. In their investigation, 88% of children treated with a 75% solution had full resolution at 2 weeks and 98% at 8 weeks.

Barnes et al.[29] suggested that the application of a localized pack over the bleeding site or the addition of a haemostatic dressing like Surgicel (Ethicon) or Kaltostat (ConvaTec Ltd, Skillman, NJ) may help to stop trickling into the nasal cavity in case of persistent bleeding after direct therapy.



Septal cauterisation done in our centre. S= septum, * = bleeder

- **NASAL PACKING:**

The anterior nasal pack achieves haemostasis by direct mechanical pressure on the bleeding site.

The posterior pack is a buttress which along with anterior pack has a tamponade effect on the entire nasal cavity.[5]

ANTERIOR PACKING:

Anterior nasal packs of ribbon gauze dipped in bismuth iodoform paraffin paste (BIPP), also known as Vaseline or an antibiotic is layered horizontally in the nasal cavity with Tilleys / bayonet forceps, around 10 cm from the anterior end, leaving around 5 cm outside. Layering begins in the postero-inferior aspect to the apex. To pack and tamponade the bleeding site, one to one and a half meter of gauze are utilised.[12]

Unpleasant taste and smell, skill, proficiency with the instruments and technique, insertion discomfort even with the use of a local anaesthetic and aspiration of layer of pack are issues of concern.

Tampon is an alternative to gauze packing. A dehydrated polyvinyl polymer sponge called Merocel is shaped into flat tampons in different sizes, is now-a-days the first line management in anterior packing.[47] Ideally available in 8- and 10-cm sizes, they suffice for both anterior and posterior packing. These are inserted in the nose, and are rehydrated with blood or saline, to swell to thrice their size, obliterating thence the nasal cavity. Antibiotic smeared to the tampon serves as a lubricant and thereby reduces the unpleasant sensation of shearing of nasal mucosa during extraction. The superiority of these tampons is that they are smooth and easier to insert and are tolerable with respect to an anterior ribbon gauge pack. Usually, packing is retained for at least 24 hours.

Merocel alone may be used or maybe combined with surgical to help control the bleed as advocated by Alshehri et al.

Bleeding was effectively managed in 96% of patients using Merocel combined with Surgicel.[48]

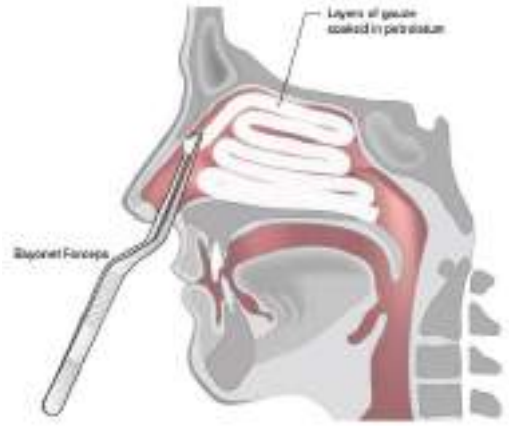
Prophylactic antibiotics are advocated in nasal packing in patients who have the packing in place for 24 to 48 hours or more as they are more vulnerable to local infection, sinusitis, or toxic shock syndrome.

To avoid the risk of antibiotic-related side effects, including Clostridium difficile and Stevens-Johnson syndrome, antibiotics are withheld in low-risk patients where packing is extracted in 48 hours. On the contrary, patients with valvular heart disease, posterior packings, and who are immunocompromised, antibiotics are strongly recommended.[39]

Vis and Van den Berge[49] study observed that in severe posterior epistaxis, cauterization can effectively treat 98% of patients without resorting to nasal packing.

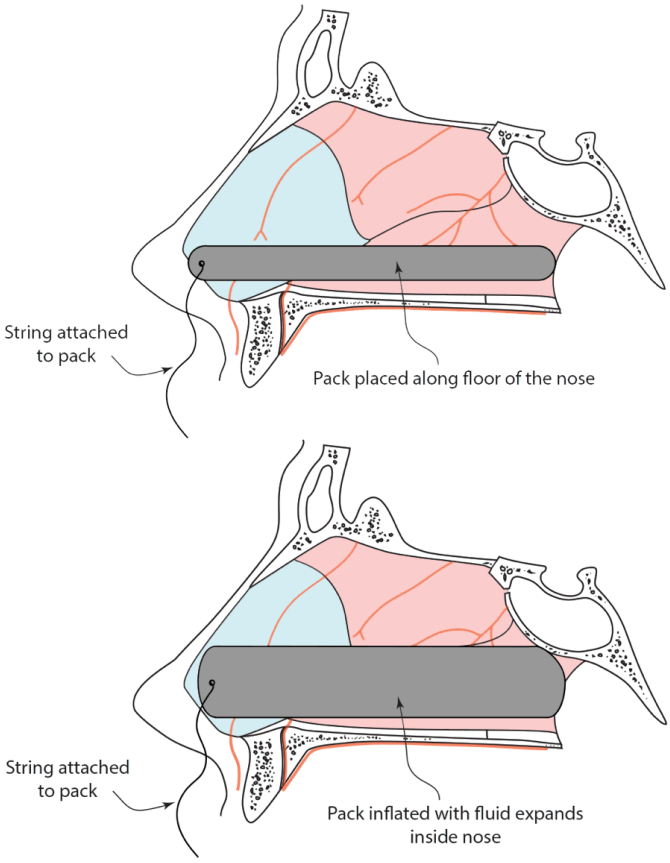
Angiographic embolization has a success rate of 71% to 95%. The side effect of this modality includes the possibility of a cerebrovascular accident, hemiplegia, ophthalmoplegia, facial nerve palsy, and soft tissue death.

MEROCEL



Nasal packing with bayonet forceps and ribbon gauze[50]

Nasal packing with merocel



Anterior Nasal Packing with Merocel

Soyka et al.[51] documented that surgical intervention gives the best results, with a failure rate of only 3% in contrast to 33%–40% for nasal packing.

Upile et al. [52] advocated that emergency medical officers, technicians and general practitioners can insert modern nasal packs with ease and relative comfort but patients who need nasal packings should be admitted.

POSTERIOR PACKING:

Posterior epistaxis with an incidence of 5% is tackled with a nasopharyngeal pack, if refractory to anterior packs. Conventionally, postnasal packs were anchored with rolled gauze tied to tapes manoeuvred through the mouth and nose.

Later, balloon catheters were adopted. The readily available urological Foley's catheter is commonly utilised. Catheter of 12 or 14 gauge with 30 mL balloon is inserted, pushed into the nasopharynx along the nasal floor after lubricating with a gel that contains water[12]; following which the balloon is inflated with 10–15 cc of saline. The catheter is then withdrawn and retained in the posterior choana. A clamp is used to secure it, and an anterior pack is inserted.

All patients with posterior nasal packing need to be hospitalized for vital monitoring, intravenous fluid and antibiotic administration.[26,39]

Nowadays, Brighton or Foley catheters have gained popularity, and are fastened transnasally with an anterior clamp, like an umbilical clip.

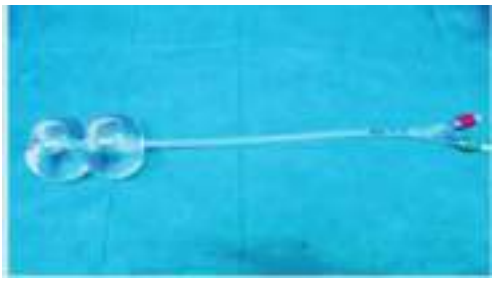
Bleeding from the posterior or superior nasal cavity typically arise from Woodruff's plexus, which includes the distal and delicate terminal branches of the sphenopalatine and the posterior ethmoidal arteries. Here, 7.5 cm nasal tampons might be used to apply greater posterior pressure. Professionals with experience can tamponade a posterior bleed using Foley catheters.[12]

Other choices for posterior nasal packing include advanced dual balloon catheters, which are inserted into the suspected bleeding side. Initially, the posterior balloon is filled with 5 to 10 mL of solution once positioned in the posterior nasal cavity. Subsequently, anterior traction is applied. Following this, the anterior balloon is inflated with 15 to 30 mL of solution, and an external umbilical clamp is applied, as previously described. Posterior nasal packing blocks the choana, applying direct pressure to the rear vessels, and also helps secure the positioning of the anterior pack.[53]

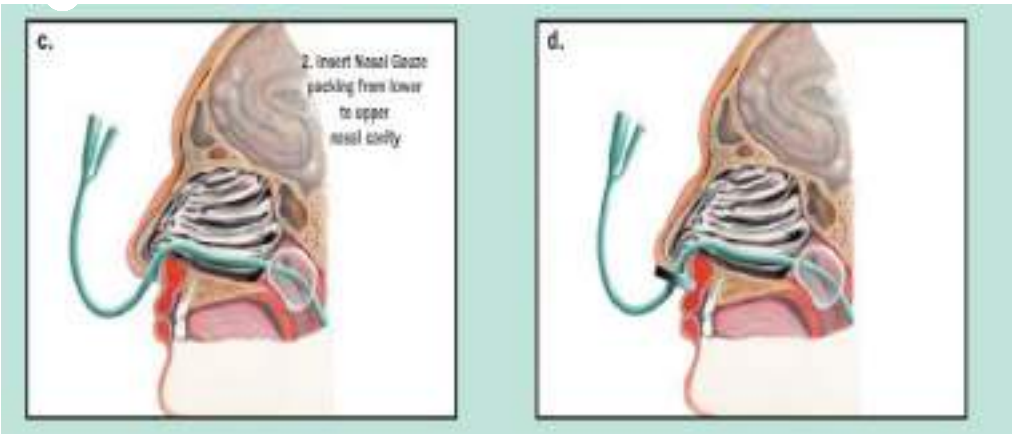
Upile et al[52] study included 60 patients with epistaxis managed with packing, of which 44 were discharged with nasal packs, while 16 were hospitalised. They concluded that patients with nasal pack can undergo “home care”, to vacate to beds for elective admissions.

Surgiflo is a recent haemostatic modality which has been advocated by Beirut et al.[54]. It is primarily utilized in neurosurgery, thoracic surgery, and vascular surgery. It can be reconstituted quickly, and its porcine gelatin matrix achieves hemostasis by facilitating thrombin action. Surgiflo is a dehydrated gelatin-thrombin matrix available in a syringe. In endonasal procedures, a gelatinous consistency is maintained to remain in the nasal cavity, achieved through reconstitution with up to 3.5 to 4 mL of sterile water. A 16 cm applicator is passed through the nasal vestibule to the nasopharynx while the subject produces a "ke-ke-ke" sound to oppose the soft palate to the Passavant’s ridge, thus sealing off the nasopharynx from the oropharynx. Surgiflo is delivered from the posterior to anterior choana, obliterating the nasopharynx and nasal cavity.

FOLEY'S CATHETER



DOUBLE BALLOON CATHETER



POSTERIOR PACKING DONE BY FOLEY'S CATHETER[55]

SURGIFLO

- **SPHENOPLATINE ATERY LIGATION:**

Transantral ligation of the internal maxillary artery was first advocated by Chandler and Serrins[56] in 1965, which was extensively utilized to treat intractable posterior epistaxis ever since. Though with high success rate, the untoward sequelae are oroantral fistula and infraorbital nerve injury.

Endoscopic transnasal sphenopalatine artery ligation is the recent technique. Budrovich and Saetti in 1992 first described endoscopic sphenopalatine artery ligation.

1 cm in front of the posterior margin of the middle turbinate, a vertical incision is made immediately above the insertion. Subperiosteal dissection traces the sphenopalatine artery at the sphenopalatine foramen.

White suggested accessing the artery within the pterygomaxillary space necessitates a wide middle meatal antrostomy as artery is often difficult to isolate medial to the foramen.[57]

Limited instrumentation i.e. the basic endoscopic sinus surgery set and a clip applicator are required. Moreover, there is low risk of intra-orbital and cerebral complications.[58] The surgical and anaesthesia duration is shorter than that required for conventional artery ligation techniques.[59] These issues are of concern for subjects who are elderly, weak, and with coexisting morbidities.

Leung et al.[60] noted that the posterior packing is uncomfortable, lengthens hospitalisation and increases the incidence upto 52% of recurrent bleed.

In embolization and sphenopalatine artery ligation, the rebleed incidence is less than 10%.

Rudmik and Leung's modelling-based economic review concluded that transnasal sphenopalatine arterial ligation was economical than embolization for intractable epistaxis.[60]

Dedhia et al. [61] study documented that after stabilisation with a posterior pack, it is cost-effective to resort to transnasal

sphenopalatine arterial ligation rather than prolonged posterior packing. The lowest-risk interventions appear to be posterior packing after transnasal sphenopalatine arterial ligation or transnasal sphenopalatine arterial ligation as a first-line choice.

Leung et al.[60] emphasised that transnasal sphenopalatine arterial ligation to be the primary modality to reduce patient risk and encourage the most effective use of healthcare resources when the risk outcomes are paired with cost-effectiveness.

Surgical intervention as primary modality for posterior epistaxis is not popular despite it recognised morbidity and efficacy.

For posterior epistaxis, Wang and Vogel[62] preferred artery ligation over antero-posterior packing, citing reduced failure rates (14.3 vs. 26.2%), lower rates of minor complications (40% vs. 68%), and a seven-fold difference in the category of life-threatening complications. Wang and Vogel demonstrated a 2.2-day reduction in hospital stay for artery ligation; however, no cost analysis was undertaken.

Gandomi et al.[63] hypothesised that the sphenopalatine artery being the terminal branch of the internal maxillary artery and is lying quite distal to cause retrograde and anastomotic blood flow from other vessels. Therefore, sphenopalatine arterial ligation is undertaken. Transantral approach has been preceded by the endoscopic transnasal route.

Gandomi[63] 27 subject study included sphenopalatine artery ligation of 30 arteries, which included bilateral intervention in 3 subjects. Age ranged from 15 to 78 years. Bipolar diathermy was employed with follow-up for 6.2 months. After surgery, there was no recurrence in the first 24 hours.

In first two weeks after surgery (the early post-operative phase), there were 3 recurrent epistaxis; in two of them required anterior nasal packing was done, while the third patient did not require medical treatment. Within the first seven days (early post-operative

time) and two months (late post-operative period), one experienced recurrent epistaxis.

Conservative measures, such as anterior nasal packing and local cautery, also had an impact on this patient. These four patients did not require any additional surgical procedures. As a result, their study's success rate was 87%.

Barnes at al.[29] 317 subject study advocated admissions for acute epistaxis and direct cautery, for management of bleeding, visibility of the bleeding site can be facilitated by the general anaesthesia and skilled assistants. Arterial ligation is resorted to when this is still not possible or there is doubt about the established control.

Snyderman et al.[64] 38 subject study involved endoscopic closure of the sphenopalatine artery. 13% experienced a severe recurrence of their epistaxis and required additional surgical intervention. Side effects noted were paraesthesia of the palate and nose (13%) and nasal crusting (34%). A three-day hospital stay was the median (range: one to ten)

Even in posterior epistaxis, endoscopic transnasal sphenopalatine artery ligation can be utilised.

Snyderman et al.[64] concluded that of all the alternatives available for the final management of posterior epistaxis, this one should be given priority. With excellent success and minimal morbidity, with respect to internal maxillary artery ligation, success rate of 92% for sphenopalatine artery ligation is quite good.

Most complications are mild and self-limiting, and are related to the preoperative interventions like nasal cautery and packing. Patients feel less discomfort from this technique compared to posterior nasal packing or transantral ligation. Moreover, patients require a short hospital stay of one to two days in ligation technique.

Klotz et al[65] analysis surgical management of posterior epistaxis which included internal maxillary artery ligation, cautery,

sphenopalatine artery ligation concluded 90% of all surgical operations for posterior epistaxis were successful on average, compared to 62% for anterior-posterior packing and 75% for embolization.

Compared to patients treated surgically (2.1 d) or with embolization (2.6 d), the packing-only group had a considerably longer mean hospitalization duration (5.29 d). The average cost of hospitalization for each patient was $5136 for effective posterior packing, $3851 for surgical therapy, and $5697 for embolization. Compared to usual packing, surgery resulted in a $1846 cost savings per patient. The groups' respective complication rates did not differ significantly.

Satoshi et al.[66] performed unilateral endoscopic ligation of the sphenopalatine artery on seven individuals, while one patient with Osler's disease underwent bilateral ligation. The hemoclip, designed for neurosurgery, was used to cut the artery. In subjects with narrow nose, it may not always be possible to ligate the sphenopalatine artery without the use of large forceps.

Three subjects underwent endoscopic maxillary artery ligation as their nasal cavity was too narrow to apply the hemoclip. In these interventions, the sphenopalatine and maxillary arteries could be identified in every patient, and the results were effective. External ligation of the ethmoidal arteries was not required. Postoperative period was uneventful, and no complications occurred during or after the procedure.

Onur et al.[67] advised, "on failure of anterior nasal packing or occurrence of posterior epistaxis, 48–72 hours after pack removal, sphenopalatine artery ligation should be resorted to."

Sphenopalatine artery ligation without anterior nasal packing for posterior epistaxis is often the primary modality. Success of posterior nasal packing in posterior epistaxis is lower than sphenopalatine ligation, with incidence of recurrent bleed between 26% to 52%. Sphenopalatine artery ligation reduces the hospitalisation

duration, the financial burden, and also improves quality of life vis a vis posterior packing.

There is a controversial issue of necessity of anterior nasal packing following sphenopalatine artery ligation. Nasal packing need not be done again once the bleeding artery has been located and clipped. Some emphasise anterior nasal packing does not reduce the likelihood of rebleeding and thus advise against it following sphenopalatine artery ligation. On the contrary, post intervention bleeding from mucosa occurs from a flap elevation on the lateral wall during surgery. Consequently, nasal packing can be placed anteriorly following sphenopalatine artery ligation.

Abdelkader et al.[68]` undertook the earliest long term and documented excellent long-term control of intractable posterior epistaxis by sphenopalatine artery ligation. While the local complication rate is extremely low, the not insignificant post-operative mortality rate seen in this series is indicative of the poor cardio-respiratory status of many of these patients.

The study emphasised that endoscopic sphenopalatine artery ligation was better than other interventions, namely ligation of the external carotid artery or internal maxillary artery via trans-antral access.

Their study included 45 arteries out which, 43 patients (30 males and 13 women) needed unilateral ligation, and 2 required bilateral ligation. The age range of these patients was 37 to 85 years, with an average of 68.5 years.

Prior to entering the operating room, patients were admitted for an average of 2.3 days, and they were relieved from the hospital 1.5 days later. Of the procedures performed, twenty-seven (60%) involved clipping only, ten (22%) involved both clipping and diathermy, and eight (18%) used diathermy only.

The average follow-up period for all patients was 15.8 months, with a range of nine to 24 months. Within the first 24 hours following surgery, no patient in the current study experienced recurrent epistaxis.

Holzmann et al[69] evaluated endoscopic sphenopalatine artery coagulation and noted that artery treated with coagulation alone recanalizes in a few days.

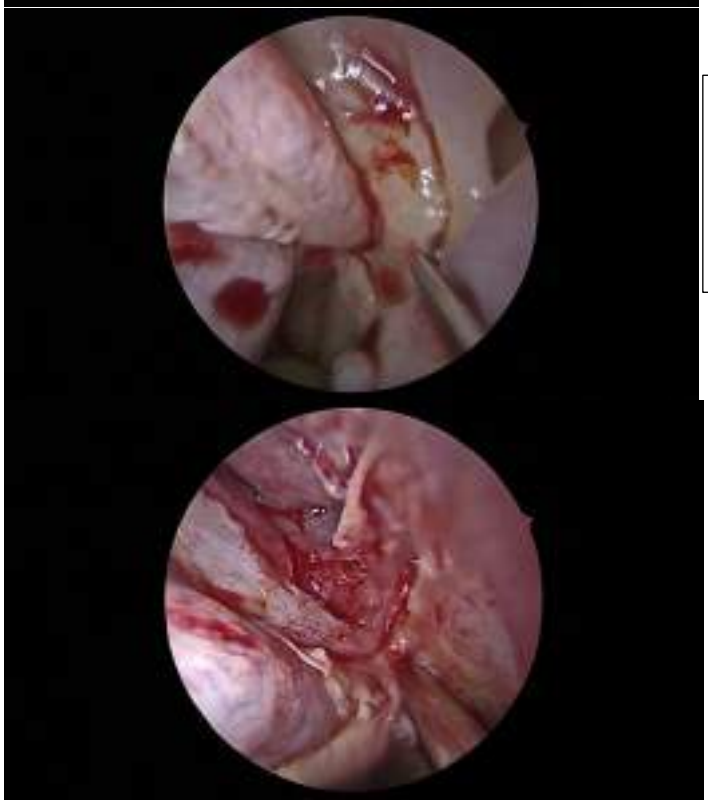
Therefore, occlusion of an artery with transsection and coagulation of both bleeding ends has to be undertaken. Cutting the artery is better than coagulation as insufficient coagulation keeps the vessel open. Moreover, there is the likelihood that the bleeding pedicle might regress into the pterygopalatine fossa.

Amdelkar et al.[68] documented that rebleeds are consequent to a variety of causes, primarily clip dislodgement or the presence of rich collateral vessels, but this failure rate may be somewhat explained by the existence of many branches at the site where the sphenopalatine artery emerges from its foramen.

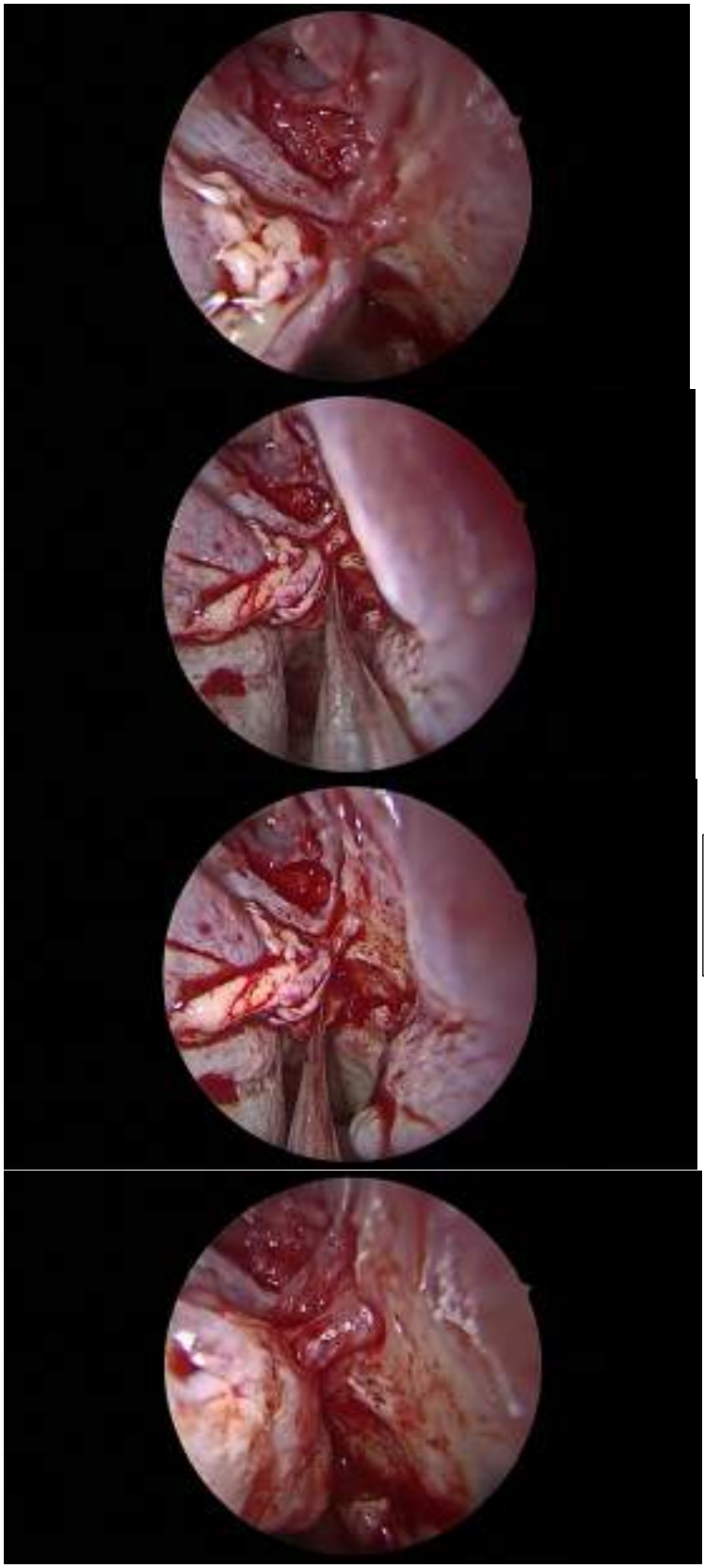
Barnes et al[29] recorded that in traumatic or postsurgical epistaxis, nasal or ethmoid bone fractures cause bleeding away from the sphenopalatine artery distribution, anterior ethmoid artery ligation is crucial. Attempts to achieve anterior ethmoidal artery ligation by endoscopic or transcaruncular methods to avoid external scars. Woolford and Jones[65] attempted the endonasal route which necessitates an approach to the artery via the lamina papyracea or mesentery. In 20 percent of cases or less, the former was possible. In most circumstances, the latter method - performed through the lamina - seems safe and practical, subject to surgeon’s dexterity. Pre - and intraoperative computed tomography scans as well as image guidance are essential in either situation.

Infiltration at crista ethmoidalis

“U” shaped incision given



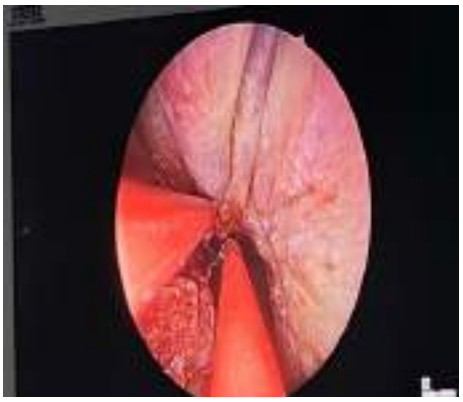
Elevation of mucoperiosteal flap at sphenopalatine foramen

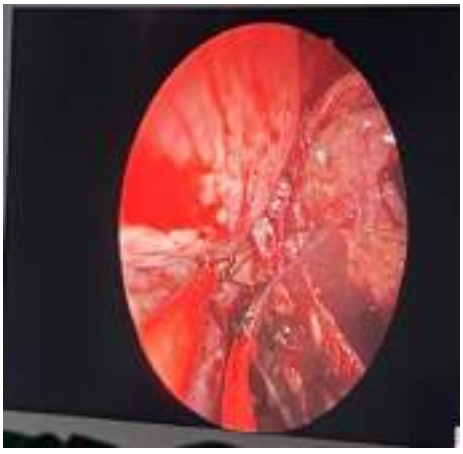


Identification of sphenopalatine artery

CLIPPING OF SHENOPALATINE ARTERY

COAGULATION OF SPHENOAPLATINE ARTERY





COMPLICATIONS:

- **CAUTERY:**

Septal perforation is secondary to a disturbance of the blood supply of the perichondrium, which leads to necrosis and subsequently a septal perforation. Blood vessels located deep in the mucosa are cauterized in to cure epistaxis. Thus, a deep partial thickness burn is adequate, but a full thickness burn cauterizes the perichondrium.

Glyn et al[46] silver nitrate cautery analysis concluded that 35% of patients treated with a 95% concentration reported bleeding episodes at 2 weeks and 10% at 8 weeks. They hypothesized that this is consequent to a large necrotic region surrounding the site of application when a larger dosage is used. This causes increased ulceration and crusting. Later, this site sloughs off with recurrent episodes of nasal bleed. Additionally, individuals receiving 75% concentration treatment reported feeling reduced discomfort.

Toner and Walby[70] documented that the rates of recurrent bleeding at two months were similar between routine hot-wire electrocautery and silver nitrate. However, the confidence interval (CI) was wide, showing a trend toward greater benefit with electrocautery (95% CI 11%–24%).

Cauterising a tiny area for a short duration necessitates meticulous care to avoid a perforated septum. Bilateral surgery is not recommended as it increases the likelihood of septal perforation.[29]

- **PACKING:**

Although uncommon, side effects like arrhythmia and death have been reported. Other problems include aspiration, syncope, nasal septal necrosis, bradycardia and hypotension due to elevated vagal tone, hypoventilation, hypoxia, and toxic shock syndrome.

Lin et al[71] reported that postnasal packs are quite unpleasant and result in severe hypoxia. It is vital to be hospitalised, receive oxygen therapy using a face mask, and occasionally get sedated; this combination raises the danger of hypoxia and aspiration.

Additional side effects from nasal packs, particularly nasopharyngeal, include sinus infection or toxic shock syndrome, alar or columellar skin necrosis, displacement of pack with obstruction of the airway, and pressure necrosis of the palate.

Tan et al.[34] documented that fever, diarrhoea, hypotension, and rash is brought on by the staphylococcal exotoxin TST-1. One-third of patients have Staphylococcus aureus identified, and 30% of those patients produce the exotoxin concluded by Breda et al.[72]

Extended packing should be avoided, anti-staphylococcal medicines should be provided as pack left for longer than 24 hours may lead to infection.

- **TRANSANTRAL SPHENOPALATINE ARTERY LIGATION:**

Endoscopic sphenopalatine artery ligation directly and safely closes the primary artery supplying the posterior nasal cavity, and avoids the issues related to surgery in the pterygopalatine fossa.[73]

Minor side effects with sphenopalatine artery ligation include paraesthesia of the palate or nose, nasal crusting, and reduced lacrimation.[64] There have also been reports of inferior tubercle necrosis and septal perforation.[74,75]

Yip et al[76] conducted study on 91 patients undergoing sphenopalatine artery ligation either emergency or elective. Four patients (4.4 per cent) had a septal perforation at post-operative review. Nineteen patients (20.9 per cent) had post-operative bleeding that extended their in-patient stay, with five patients (5.5 per cent) requiring revision surgery. Pre-operative non-dissolvable nasal packing was used a median of 1 time (range, 0-8 times).

MATERIAL AND METHODS:

SOURCE OF DATA:

In this prospective study of 1 year (September 2022 to September 2023), subjects presenting with epistaxis in outpatient clinics or casualty services of a tertiary care facility were included. Single modality or sequential multiple modalities were adopted to control nasal bleeds.

The under mentioned techniques were adopted:

i. Septal cauterization
ii. Nasal packing
iii. Arterial Ligation (sphenopalatine/ internal maxillary)

METHOD OF COLLECTION OF DATA

The following information was recorded for each patient: age, sex, side of bleeding, visibility of bleeding source (i.e. anterior/posterior epistaxis), number of recurrences, and previous intervention or modalities adopted.

All patients were consecutively included. Persistent bleeding despite treatment within 24 hours was counted as an immediate failure. Patients were followed up till 4 weeks with regular visits at one, two and four weeks.

INCLUSION CRITERIA

All patients presenting with epistaxis either in emergency, outpatient or inpatient department.

EXCLUSION CRITERIA

i. Thalassemia
ii. Neoplasm of nose
iii. Patient on antiplatelets
iv. Not consenting for any intervention

NO. OF PATIENTS:

All patients of epistaxis in a period of one year were enrolled in this prospective study.

DATA USED:

i. History:

Case histories of patients with epistaxis were analysed prospectively regarding site, underlying comorbidities, haematological investigations, clinical course, diagnosis, treatment instituted, and outcome.

ii. Clinical examination:

ENT examination, anterior/ posterior rhinoscopy, nasal endoscopic assessment wherever possible.

iii. Therapeutic modality:

Single v/s multiple modalities. Modalities include: septal cauterisation, nasal packing, sphenopalatine ligation, internal maxillary artery ligation

STATISTICAL ANALYSIS:

Data was described in terms of range, mean ± standard deviation (±SD), frequency (No of cases) and relative frequencies (%age) as appropriate. Chi square test was applied for analysing categorical data. A probability value (p-value) less than 0.5 was considered statistically significant.

OUTCOME:

i. Evaluation of success rate of single modality or multiple modalities in the control of epistaxis and to determine the ideal modality.

ii. Outcome was based upon postoperative nasal crusting, bleeding and formation of synechiae.

OBSERVATIONS AND RESULTS

The study was conducted in 100 patients who presented with epistaxis in emergency, inpatient department and outpatient department of Dayanand Medical College and Hospital, Ludhiana. The data thus collected was tabulated and analysed from the under mentioned aspects:

A. Demographic profile
B. Clinical profile
C. Comorbid conditions
D. Personal History
E. Investigations
F. Site of Epistaxis
G. Modalities used
H. Post treatment follow up

A. DEMOGRAPHIC PROFILE:

1. AGE:

TABLE 1

AGE DISTRIBUTION

(n= 100)

AGE GROUP	No. of cases	Percentage
< 20	9	9.0%
21-30	19	19.0%
31-40	11	11.0%
41-50	15	15.0%
51-60	22	22.0%
> 60	24	24.0%
Total	100	100.0%

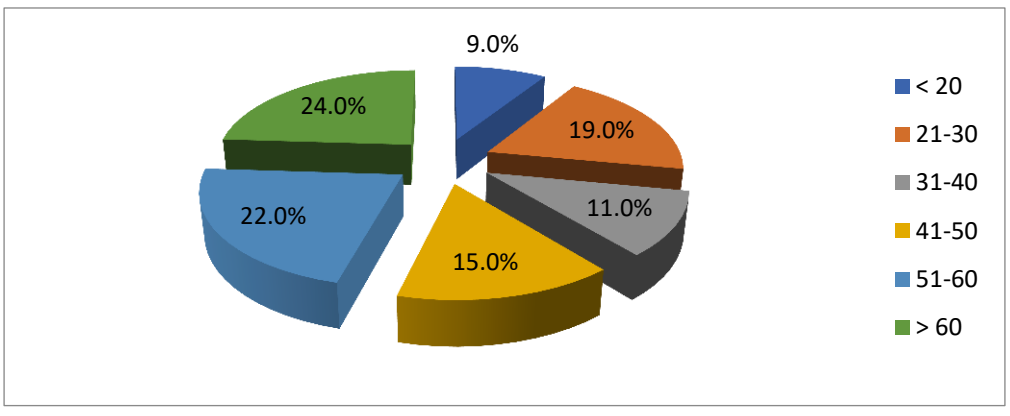
n = total number of patients %= percentage of patients

Out of 100 patients, 9% (n=9) belonged to the paediatric age group, 67% (n=67) in age group of 20- 60 years: 19% in 21-30, 11% in 31-40, 15% in 41-50, 22% in 51-60 and rest 24% (n=24) fell in age group older than 60 years. The mean age of patients of epistaxis enrolled in the study was 45.38 years with minimum age of 9 years and maximum being 85 years. 51-60 years (22%) was the predominant age group in our study.

FIGURE 1

AGE DISTRIBUTION

(n= 100)



2. GENDER:

TABLE II
GENDER DISTRIBUTION

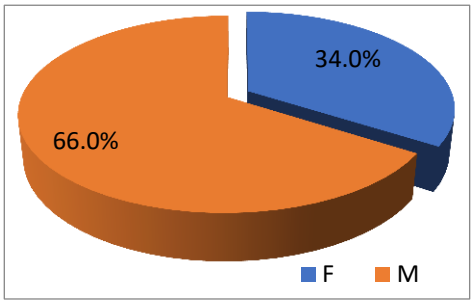
(n = 100)

SEX	No. of cases	Percentage
F	34	34.0%
M	66	66.0%
Total	100	100.0%

n = total number of patients
%= percentage of patients

Out of 100 patients, 66% (n=66) were males and 34% (n=34) were females. Selection of patients was random and irrespective of gender

FIGURE II
GENDER DISTRIBUTION
(n= 100)



Male patients (66%) outnumbered the female patient.

3. RESIDENTIAL AREA:

TABLE III
GEOGRAPHIC DISTRIBUTION

(n=100)

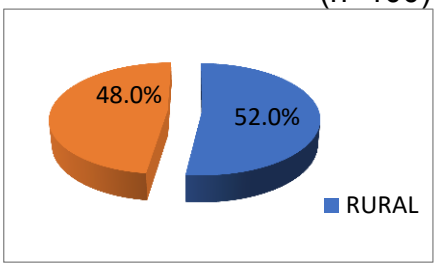
Address	No. Of cases	Percentage
Rural	52	52.0%
Urban	48	48.0%
Total	100	100.0%

n = total number of patients
%= percentage of patients

52% had rural background whereas 48% of patient belonged to urban areas.

TABLE III
GEOGRAPHIC DISTRIBUTION

(n=100)



Majority of patients belonged to rural areas (52%).

4. AGE V/S GENDER:

TABLE IV
AGE V/S GENDER

(n=100)

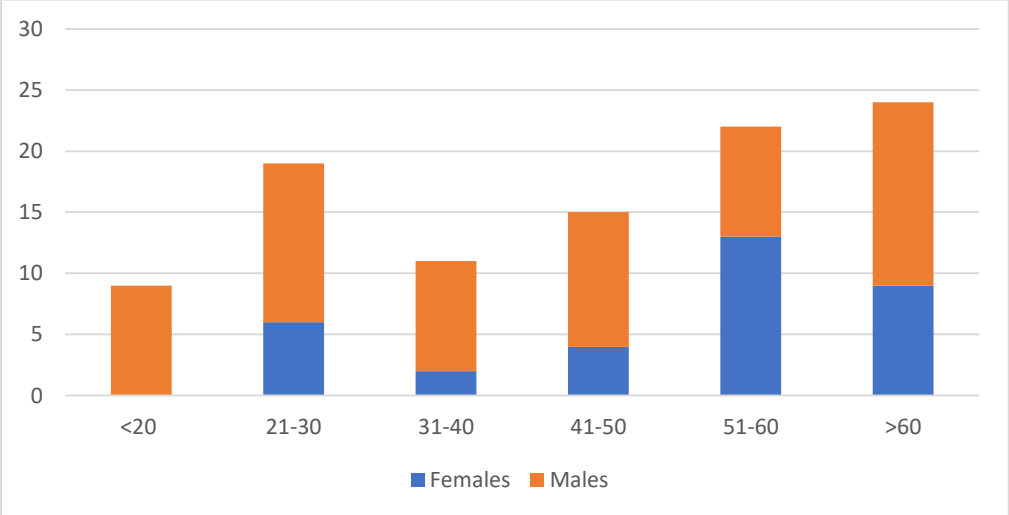
		SEX				Total	Chi-square value	p-value
		F		M				
AGE GROUP	< 20	0	0.0%	9	13.6%	9	12.575	**0.028**
	21-30	6	17.6%	13	19.7%	19		
	31-40	2	5.9%	9	13.6%	11		
	41-50	4	11.8%	11	16.7%	15		
	51-60	13	38.2%	9	13.6%	22		
	> 60	9	26.5%	15	22.7%	24		
Total		34	100.0%	66	100.0%	100		

n = total number of patients %= percentage of patients

In age group <20 years, only males presented with epistaxis (13.6%), for 21-30 age groups, there were 6 females and 13 males, 31-40 age group, there were 2 females and 9 males. In age group 41-50 age group, 4 females and 15 males, 51-60 had 13 females and 9 males. In more than 60 years, we had 9 females and 15 females.

FIGURE IV
AGE V/S GENDER

(n=100)



Maximum patients belonged to age group: 51-60 years (22%)

Minimum patients belonged to: less than 20 years (9%).

5. OCCUPATION:

TABLE V

OCCUPATION

(n=100)

OCCUPATION	No. of cases	Percentage
BUSINESS	12	12.0%
CARPENTER	3	3.0%
COMPUTER TECH.	1	1.0%
CORPORATE JOB	2	2.0%
FARMER	10	10.0%
GENERAL PHYSICIAN	1	1.0%
GRADUATE	5	5.0%
HOUSEWIFE	25	25.0%
LABOURER	9	9.0%
LAWYER	2	2.0%
LECTURER	1	1.0%
NON WORKING	1	1.0%
POLICE	2	2.0%
RETIRED	5	5.0%
SHOPKEEPER	2	2.0%
SOFTWARE ENGG	2	2.0%
STUDENT	13	13.0%
TEACHER	4	4.0%
Total	100	100.0%

n = total number of patients %= percentage of patients

47% were illiterate i.e. 25% were housewives, 10% were farmers, 9% were labourers, 3% were carpenters. 53% had some form of education, 13% were students, 5% were retired, 14% owned some kind of business, 15% patients had higher education.

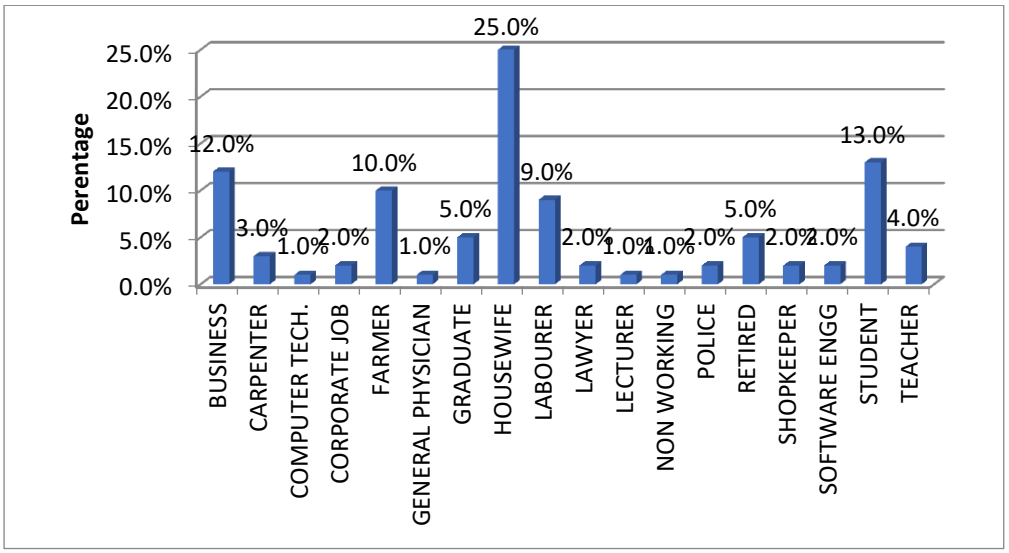
Maximum subjects were housewives (25%), 10% had urban background, 15% had rural background.

Minimum subjects were either non-working (1%) or lecturer (1%)

FIGURE V

OCCUPATION

(n=100)



Most subjects belonged to high socioeconomic status (61%): businessman (12%), computer technician (1%), working corporate job (2%), general physician (1%), graduate (5%), housewives (10%), lawyer (2%), lecturer (1%), non-working (1%), police officer (2%), software engineer (2%), retired (5%), student (13%), and teacher (4%). Only 39% belonged to poor socioeconomic status.

B. CLINICAL PROFILE:

TABLE VI

PATIENT PRESENTATION

(n=100)

CHIEF COMPLAINTS	No. of cases	% of patients
Epistaxis	100	100%
Nasal blockage	26	26%
Nasal trauma	10	10%

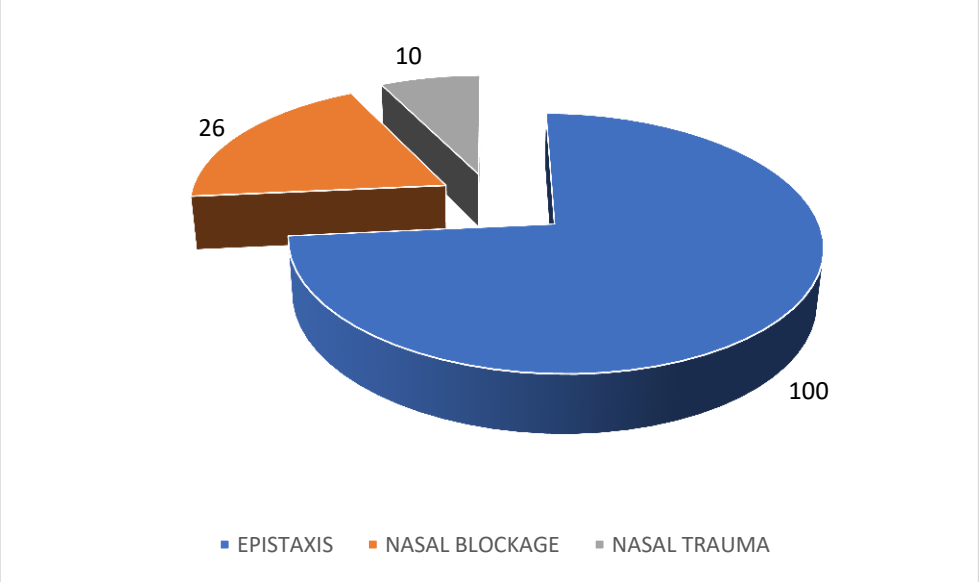
n = total number of patients %= percentage of patients

In patients of epistaxis, only 26 (26%) had nasal blockage preceded by epistaxis and 10 (10%) suffered nasal trauma.

FIGURE VI

PATIENT PRESENTATION

(n=100)



Nasal obstruction was noted in 26 (26%) of subjects of epistaxis.

1. LATERALITY OF EPISTAXIS:

TABLE VII A

LATERALITY OF EPISTAXIS

(n=100)

EPISTAXIS	No. of cases	Percentage
L	47	47.0%
R	53	53.0%
Total	100	100.0%

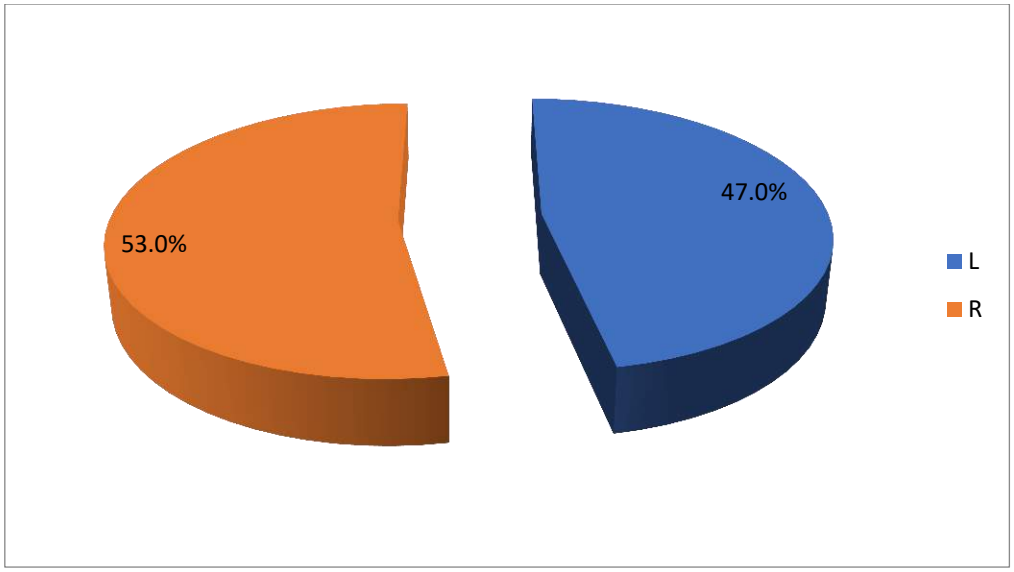
n = total number of patients %= percentage of patients

Right sided epistaxis (53%) was predominant with respect to the left (47%).

FIGURE VII A

LATERALITY OF EPISTAXIS

(n=100)



53 (53%) had right sided epistaxis, while only 47 (47%) had left sided.

2. LATERALITY V/S AGE:

TABLE VII B

LATERALITY V/S AGE

(n=100)

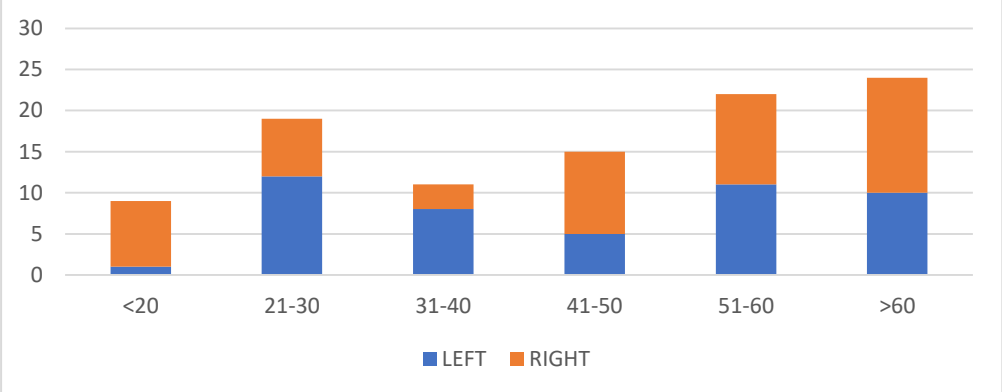
		CHIEF COMPLAINTS_EPISTAXIS				Total	Chi-square value	p-value
		L		R				
AGE GROUP	< 20	1	2.1%	8	15.1%	9	11.046	**0.05**
	21-30	12	25.5%	7	13.2%	19		
	31-40	8	17.0%	3	5.7%	11		
	41-50	5	10.6%	10	18.9%	15		
	51-60	11	23.4%	11	20.8%	22		
	> 60	10	21.3%	14	26.4%	24		
Total		47	100.0%	53	100.0%	100		

n = total number of patients %= percentage of patients

In less than 20 years group, 1 suffered epistaxis from left side while 8 from right side. For 21-30 age group, 12 had left side while 7 had right side bleed. For 31-40 age group, 8 were left sided bleed, and 3 were right sided, 41-60 age group, 5 were left sided and 10 were right sided, 51-60 age group, 11 were left sided while 11 were right sided bleed. In greater than 60 years group, 10 had left sided bleed and 14 had right sided bleed.

FIGURE VII B
LATERALITY V/S AGE

(n=100)



Maximum subjects belonged to age group 21-30 for left sided (25.5%), and more than 60 year age group for right sided (26.4%).

Minimum subjects belonged to 41-50 age group for left sided (10.6%) and 31-40 age group for right sided bleed (5.7%).

3. DURATION:

TABLE VIII

DURATION OF EPISTAXIS

(n=100)

DURATION (DAYS) GP	No. of cases	Percentage
< 7	70	70.0%
8-14.0	10	10.0%
15-21.0	2	2.0%
> 21	18	18.0%
Total	100	100.0%

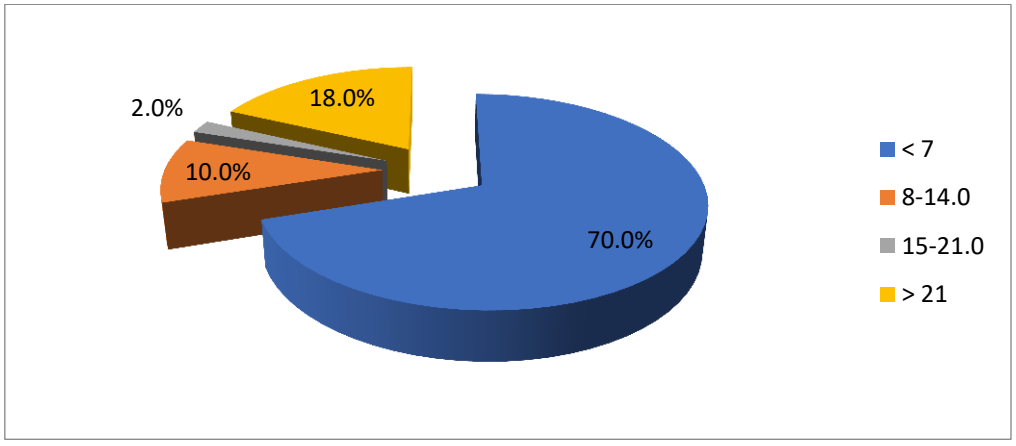
n = total number of patients %= percentage of patients

Majority of patients, n=70, had epistaxis of duration lees than 7 days, while 10 had duration of 8-14 days, 2 of 14-21 days and only 18, more than 21 days. The mean duration of duration of epistaxis was 12.07 days.

FIGURE VIII

DURATION OF EPISTAXIS

(n=100)



70% of patients presented within 7 days, while 18% within 3 weeks.

Maximum subjects had epistaxis of less than 7 days (70%).

Minimum subjects had duration of 15-21 days (2%).

C. COMORBIDITIES:

TABLE IX

CORMORBIDITIES

(n=100)

COMORBIDITIES	No. of patients	% of patients
Diabetes	24	24%
HTN	61	61%
CAD	0	0%

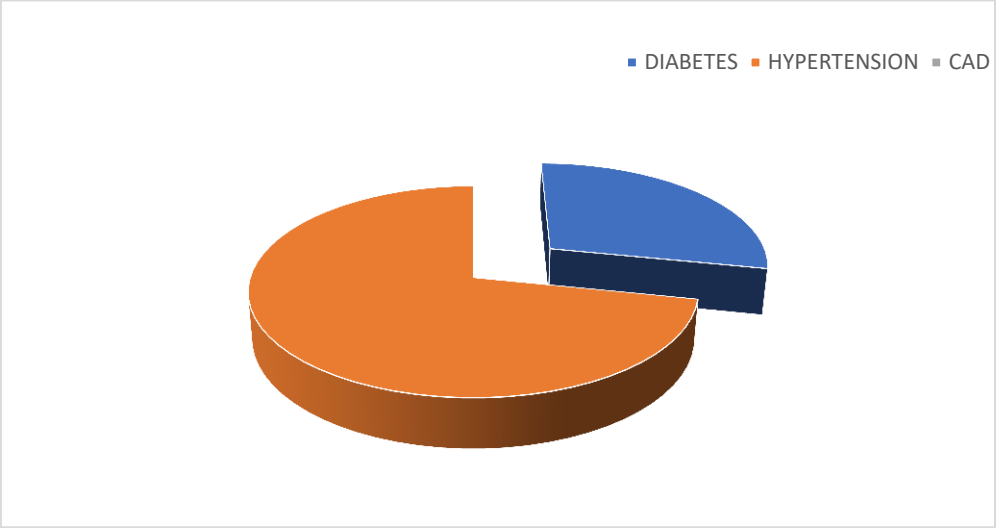
n = total number of patients %= percentage of patients

24 (24%) of patients with epistaxis were diabetic, 61(61%) were hypertensives. None had any underling coronary artery disease.

FIGURE IX

COMORBIDTIES

(n=100)



Most subjects had hypertension (61%) followed by diabetes (24%) as underlying comorbidities.

1. DIABETES

TABLE X

DIABETIC STATUS

(n=100)

Diabetes	No. of cases	%
N	76	76.0%
Y	24	24.0%
Total	100	100.0%

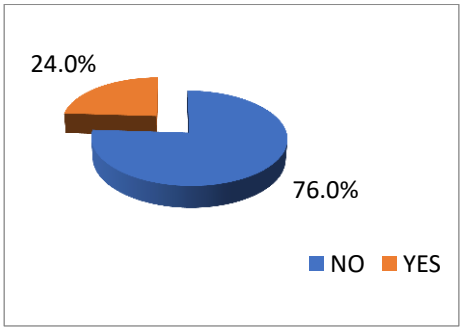
n = total number of patients
%= percentage of patients

Majority 76 (76%) of the patients of epistaxis were non diabetic whereas 24% of the patients were diabetic.

FIGURE X

DIABETIC STATUS

(n=100)



Most of the patients were non diabetic.

2. HYPERTENSION:

TABLE XI

HYPERTENSION

(n=100)

Hypertension	No. of cases	Percentage
N	39	39.0%
Y	61	61.0%
Total	100	100.0%

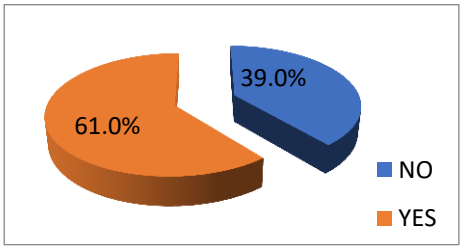
n = total number of patients
%= percentage of patients

61% of patients were found to be hypertensive while 39% were non hypertensive.

FIGURE XI

HYPERTENSION

(n=100)



Most of the patients in our study were hypertensives (61%).

3. DIABETIC STATUS V/S GENDER:

TABLE XII

DIABETES V/S GENDER

(n=100)

	GENDER				
	MALE		FEMALE		TOTAL
DIABETIC	15	22.70%	9	26.50%	24
NON-DIABETIC	51	77.30%	25	73.50%	76
TOTAL	66	100%	34	100%	100

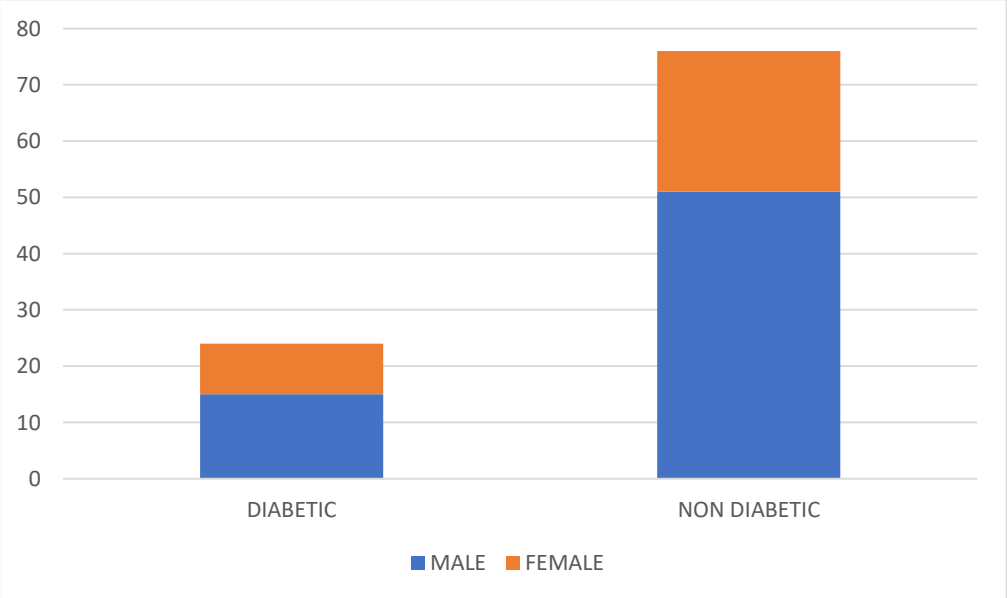
n = total number of patients %= percentage of patients

Out of the 24 suffering from diabetes, 15 (22.7%) were males whereas 9 (26.5%) were females. Rest 76% were non diabetic which included 51 (77.3%) males and 25 (73.5%) females.

FIGURE XII

DIABETIC STATUS V/S GENDER

(n=100)



Most of the diabetics were male (62.5%) than females (37.5%).

4. HYPERTENSION V/S GENDER:

TABLE XIII

HYPERTENSION V/S GENDER

(n=100)

	GENDER				
	MALE		FEMALE		TOTAL
HYPERTENSIVES	40	60.60%	21	61.70%	61
NON-HYPERTENSIVES	26	39.40%	13	38.30%	39
TOTAL	66	100%	34	100%	100

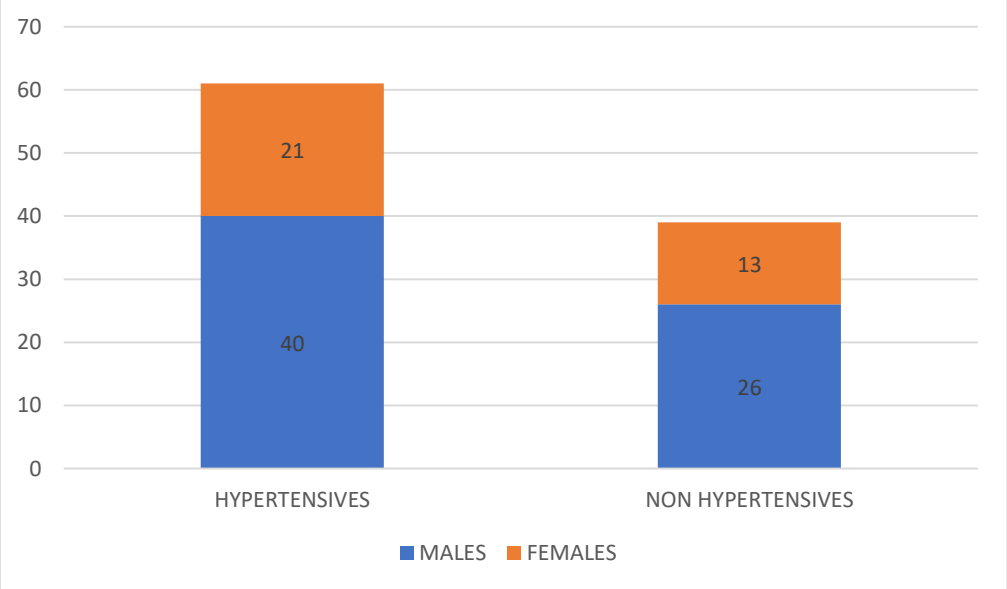
n = total number of patients %= percentage of patients

Out of the 61 hypertensive subjects, 40 (60.6%) were males and 21 (61.6%) females. Rest 39 non hypertensives included 26 (39.4%) males and 13 females (38.3%).

FIGURE XIII

HYPERTENSION V/S GENDER

(n=100)



Most hypertensives were male (60.6%).

D. PERSONAL HISTORY:

TABLE XIV

PERSONAL HISTORY

(n=100)

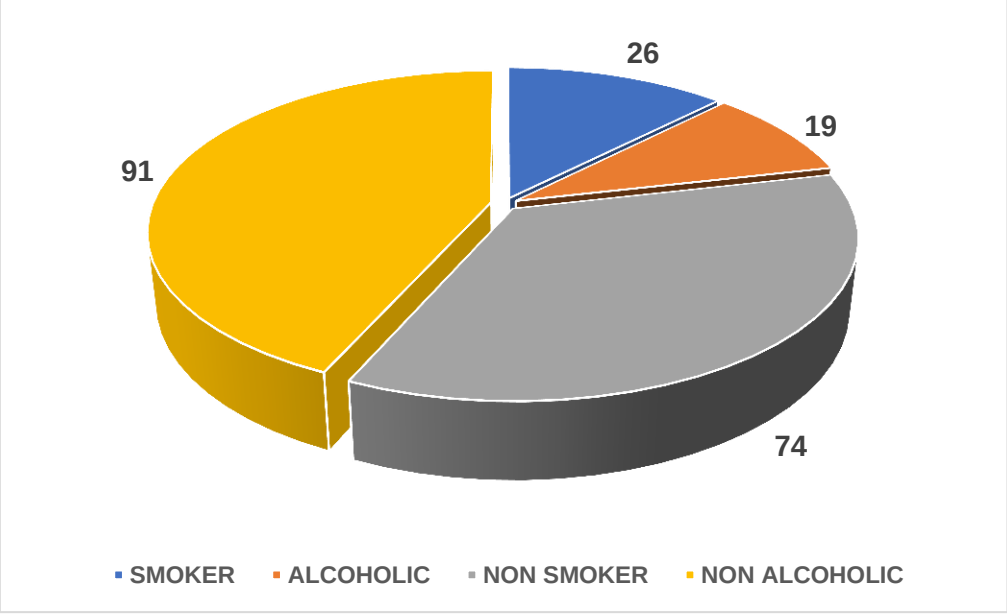
HISTORY	No. of patients	% of patients
SMOKING	26	26%
ALCOHOL	19	19%

n = total number of patients %= percentage of patients

Epistaxis was seen more in smokers (26%) than in alcoholics (19%) in our subjects. Though 55% of our subjects did not have these habits but 45% were alcoholic/smokers.

FIGURE XIV
PERSONAL HISTORY

(n=100)



1. SMOKING:

TABLE XV

SMOKING

(n=100)

Smoking	No. of cases	Percentage
N	74	74.0%
Y	26	26.0%
Total	100	100.0%

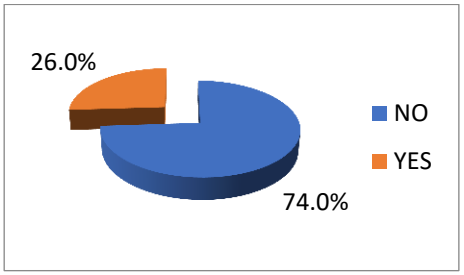
n = total number of patients
%= percentage of patients

26% of patients were smokers whereas 74% were non-smokers.

FIGURE XV

SMOKING

(n=100)



Mostly patients in our study were non smokers.

2. ALCOHOL:

TABLE XVI

ALCOHOL

(n=100)

Alcohol	No. of cases	Percentage
N	81	81.0%
Y	19	19.0%
Total	100	100.0%

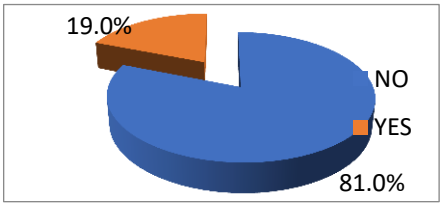
n = total number of patients
%= percentage of patients

19% of patients were alcoholic whereas 81% were non-alcoholic.

FIGURE XVI

ALCOHOL

(n=100)



Mostly patients in our study were non-alcoholic.

E. INVESTIGATIONS:

TABLE XVII

INVESTIGATIONS

(n=100)

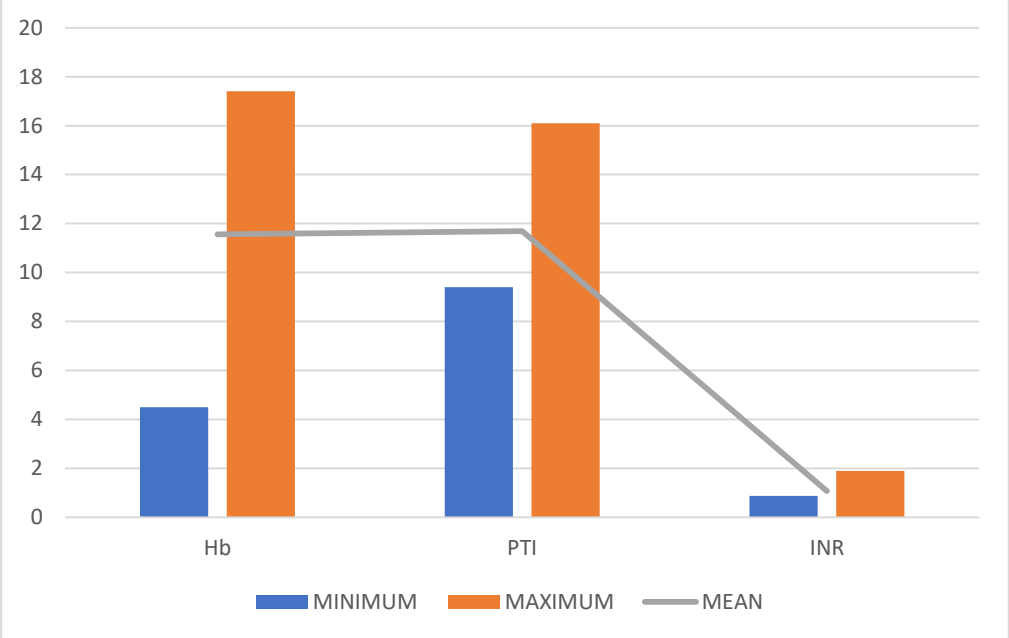
Investigation		MIN.	MAX.	MEAN	SD
Hb	100	4.50	17.40	11.56	2.53
PTI	100	9.40	16.10	11.69	1.10
INR	100	0.88	1.90	1.07	0.13

n = total number of patients %= percentage of patients

FIGURE XVII

INVESTIGATIONS CONDUCTED

(n=100)



In the study, patients' haemoglobin ranged between 4.5 g – 17.4 g, with mean of 11.56 g, and mean PTI/INR was 11.69/1.07.

- **USE OF BLOOD PRODUCTS:**

TABLE XVIII

USE OF BLOOD PRODUCTS

(n=100)

USE OF BLOOD PRODUCTS	No. of cases	Percentage
1 PRBC	6	6.0%
1 PRBC/ 1 FFP	1	1.0%
2 PRBC	2	2.0%
N	91	91.0%
Total	100	100.0%

n = total number of patients %= percentage of patients

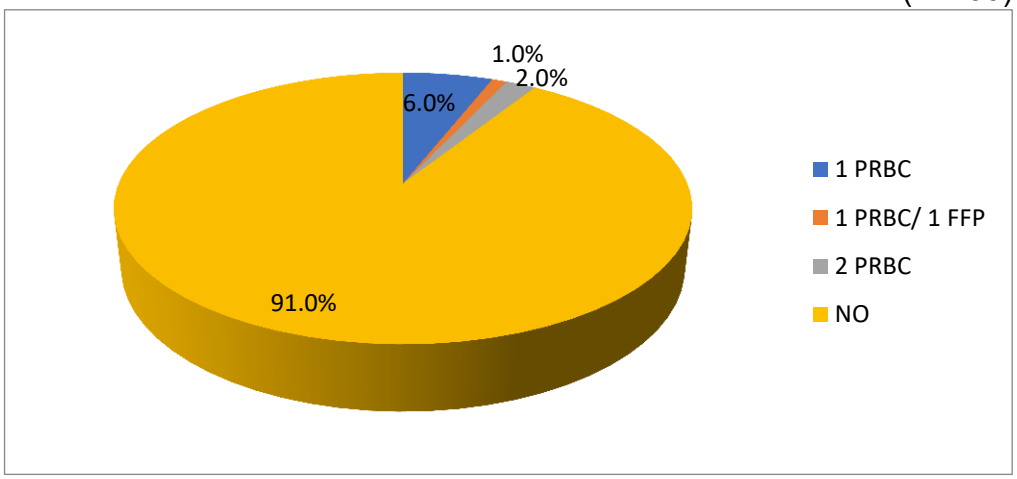
(PRBC = packed red blood cells, FFP = fresh frozen plasma)

6 patients received 1 PRBC, 1 patient had 1 packed cell and 1 fresh frozen plasma transfusion, 2 patients received 2 packed cells while 91 had no transfusion.

FIGURE XVIII

USE OF BLOOD PRODUCTS

(n=100)



Maximum patients (n=6) received 1 packed cell

Only 1 patient was transfused 1 packed cell with 1 fresh frozen plasma

F. SITE OF EPISTAXIS:

TABLE XIX

SITE OF EPISTAXIS

(n=100)

EPISTAXIS	No. of cases	Percentage
ANTERIOR	47	47.0%
POSTERIOR	53	53.0%
Total	100	100.0%

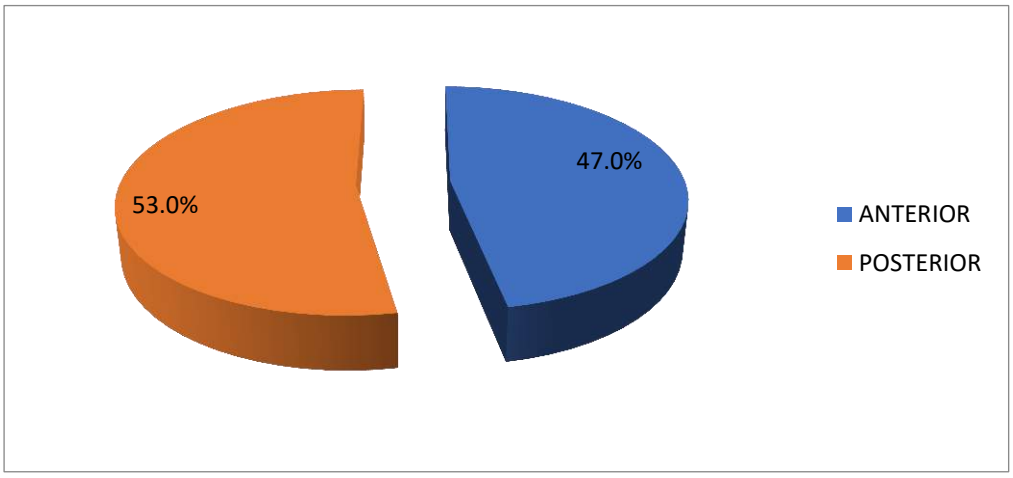
n = total number of patients %= percentage of patients

Posterior epistaxis was prominent, n= 53 (53%), with respect to anterior epistaxis, n= 47 (47%).

FIGURE XIX

SITE OF EPISTAXIS

(n=100)



Most of the bleed encountered in our study was arising posteriorly rather than anteriorly.

- **AGE V/S SITE:**

TABLE XX

AGE V/S SITE OF EPISTAXIS

(n=100)

		EPISTAXIS				Total	Chi-square value	p-value
		ANTERIOR		POSTERIOR				
AGE GROUP	< 20	7	14.9%	2	3.8%	9	8.72	0.121
	21-30	10	21.3%	9	17.0%	19		
	31-40	4	8.5%	7	13.2%	11		
	41-50	3	6.4%	12	22.6%	15		
	51-60	11	23.4%	11	20.8%	22		
	> 60	12	25.5%	12	22.6%	24		
Total		47	100.0%	53	100.0%	100		

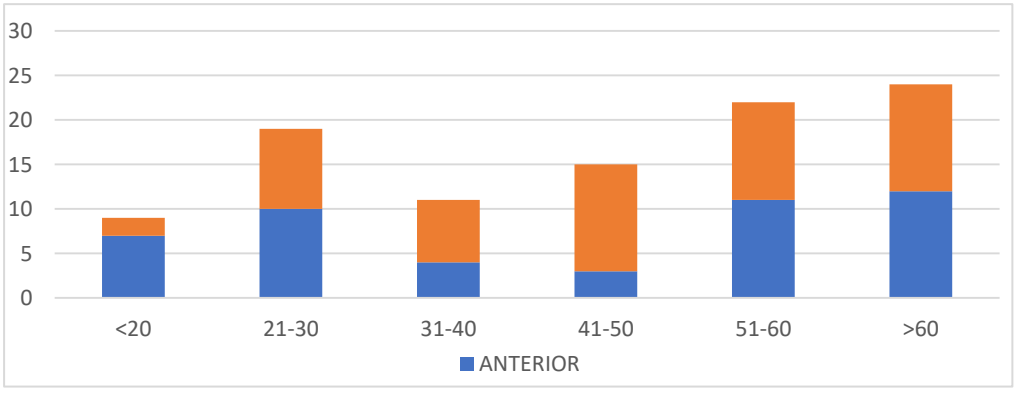
n = total number of patients %= percentage of patients

In less than 20 years age group, 7 had anterior epistaxis while 2 had posterior epistaxis. In 21-30 age groups, 10 had anterior while 9 had posterior bleed. For 31-40 age groups, 4 were anterior epistaxis, and 7 were posterior, 41-60 age group, 3 were anterior and 12 were posterior, 51-60 age group, 11 were anterior bleed while 11 were posterior bleed. In more than 60 years, 12 had anterior epistaxis and 12 had posterior epistaxis.

FIGURE XX

AGE V/S SITE OF EPISTAXIS

(n=100)



Maximum subjects belonged to more than 60 years age group for both anterior and posterior

Minimum patients belonged to 41-50 age group for anterior epistaxis and less than 20 years age group for posterior epistaxis

- **GENDER V/S SITE OF EPISTAXIS:**

TABLE XXI
GENDER V/S SITE OF EPISTAXIS

(n=100)

	GENDER				
	MALE		FEMALE		TOTAL
ANTERIOR	27	41.00%	20	58.80%	47
POSTERIOR	39	59.00%	14	41.20%	53
TOTAL	66	100%	34	100%	100

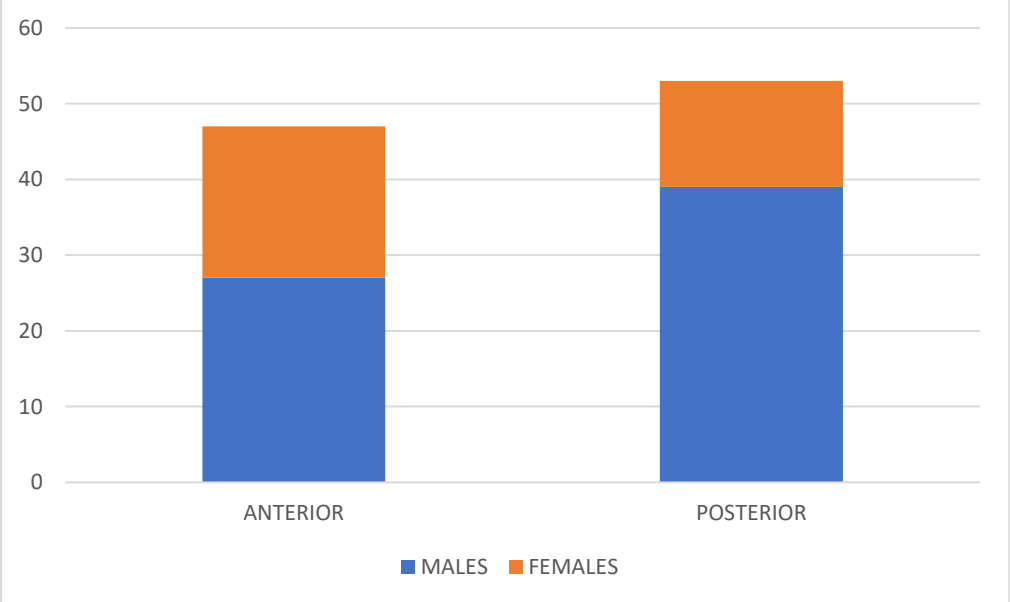
n = total number of patients %= percentage of patients

In this study, 47 subjects suffered anterior epistaxis: 27 were male and 20 females. 53 had posterior epistaxis: 39 were male and 14 were female.

FIGURE XXI

GENDER V/S SITE OF EPISTAXIS

(n=100)



Males were predominantly affected in both anterior (41%) and posterior epistaxis (59%).

G. MODALITIES USED:

The various modalities used for epistaxis in our study:

TABLE XXII
VARIOUS MODALITIES USED

(n=100)

Treatment	No. of cases	Percentage
ESPAL	12	12.0%
NP	18	18.0%
NP/ESPAL	38	38.0%
SC	25	25.0%
NP/SC	7	7.0%
Total	100	100.0%

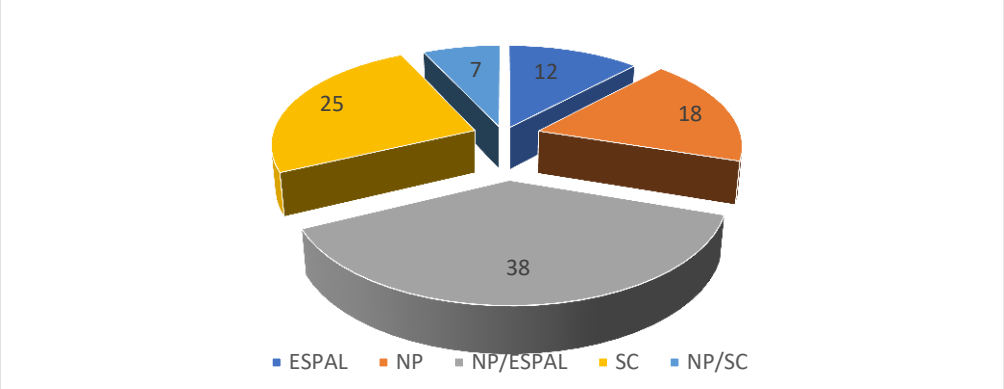
n = total number of patients %= percentage of patients

Most of the patients were treated with dual modality i.e. nasal packing followed by sphenopalatine artery ligation (38%), followed by septal cauterisation (25%), followed by nasal packing (18%), and then sphenopalatine artery ligation (12%). Only 7 % were treated with nasal packing followed by septal cauterisation.

FIGURE XXII

VARIOUS MODALITIES USED

(n=100)



Maximum patients, n=38 (38%), were treated by nasal packing followed sphenopalatine artery ligation

Minimum patients, n= 7 (7%), were treated by septal cauterisation.

1. SEPTAL CAUTERISATION:

TABLE XXIII

SEPTAL CAUTERISATION

(n=100)

SEPTAL CAUTERISATION	No. of cases	Percentage
0	68	68.0%
1	32	32.0%
Total	100	100.0%

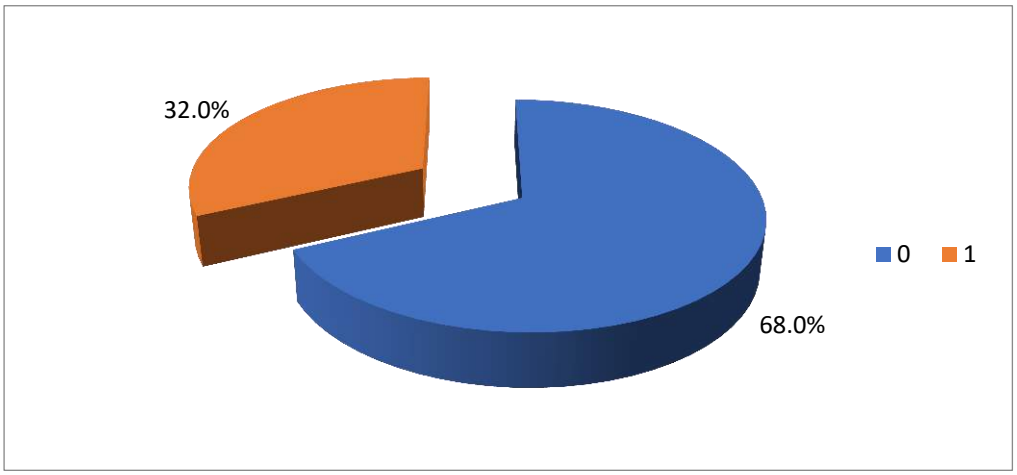
n = total number of patients %= percentage of patients

32 subjects (32%) underwent septal cauterisation while 68 (68%) had other treatment.

FIGURE XXIII

SEPTAL CAUTERISATION

(n=100)



Only 32 (32%) patients necessitated septal cauterisation either as single modality or as in multiple modalities.

2. NASAL PACKING:

TABLE XXIV

NASAL PACKING

(n=100)

NASAL PACKING	No. of cases	Percentage
N	37	37.0%
Y	63	63.0%
Total	100	100.0%

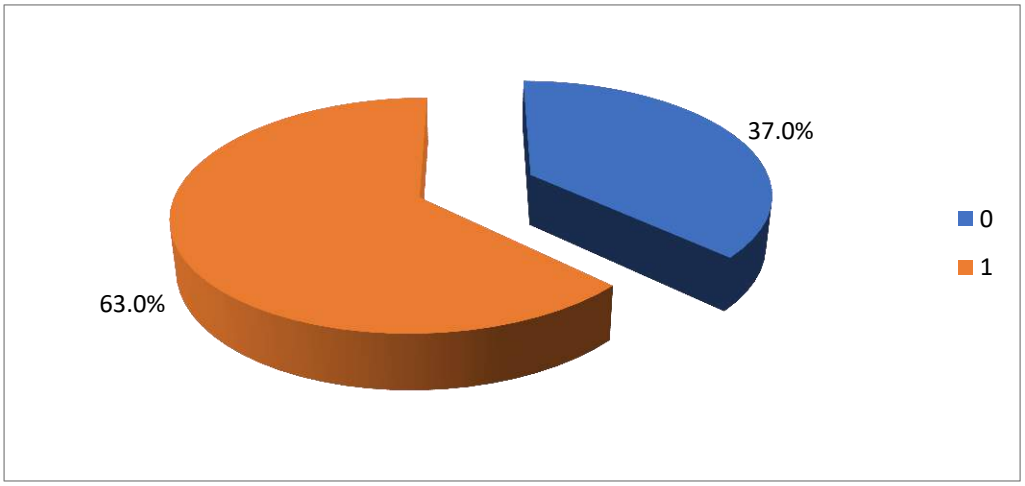
n = total number %= percentage

In our study, 63% of patients had received nasal packing while 37% had no nasal packing.

FIGURE XXIV

NASAL PACKING

(n=100)



Majority of patients either came with pack in situ (46%) or had packing done in the centre (17%).

3. ENDOSCOPIC SPHENOPALATINE ARTERY LIGATION:

TABLE XXV

SPHENOPALATINE ARTERY LIGATION

(n=100)

ESPAL	No. of cases	Percentage
N	50	50.0%
Y	50	50.0%
Total	100	100.0%

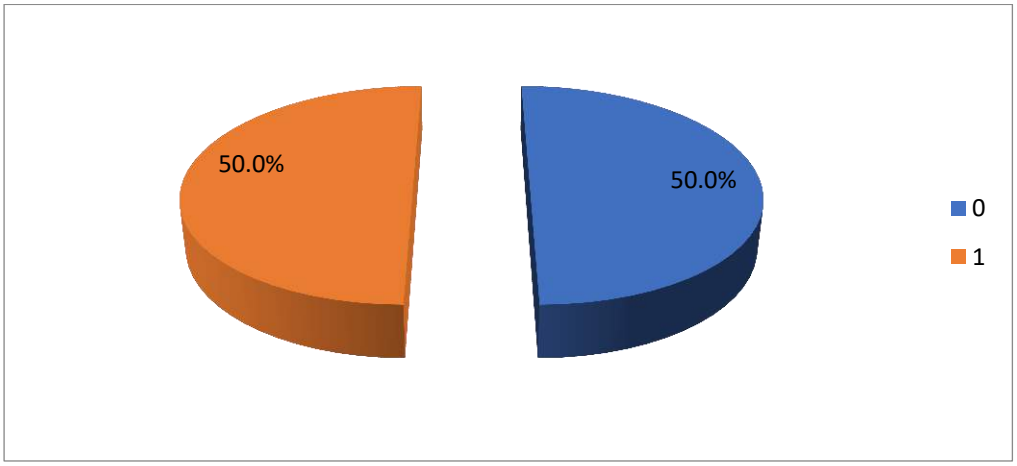
n = total number of patients %= percentage of patients

50 (50%) underwent sphenopalatine artery ligation while rest 50% received other therapeutic modalities.

FIGURE XXV

SPEHOPALATINE ARTERY LIGATION

(n=100)



50 (50%) were treated by single modality i.e. sphenopalatine artery ligation while the rest 50 (50%) had to undergo other modalities.

4. INTERNAL MAXILLARY ARTERY LIGATION:

TABLE XXVI

INTERNAL MAXILLARY ARTERY LIGATION

(n=100)

INTERNAL MAXILLARY BR. LIGATION	No. of cases	Percentage
N	99	99.0%
Y	1	1.0%
Total	100	100.0%

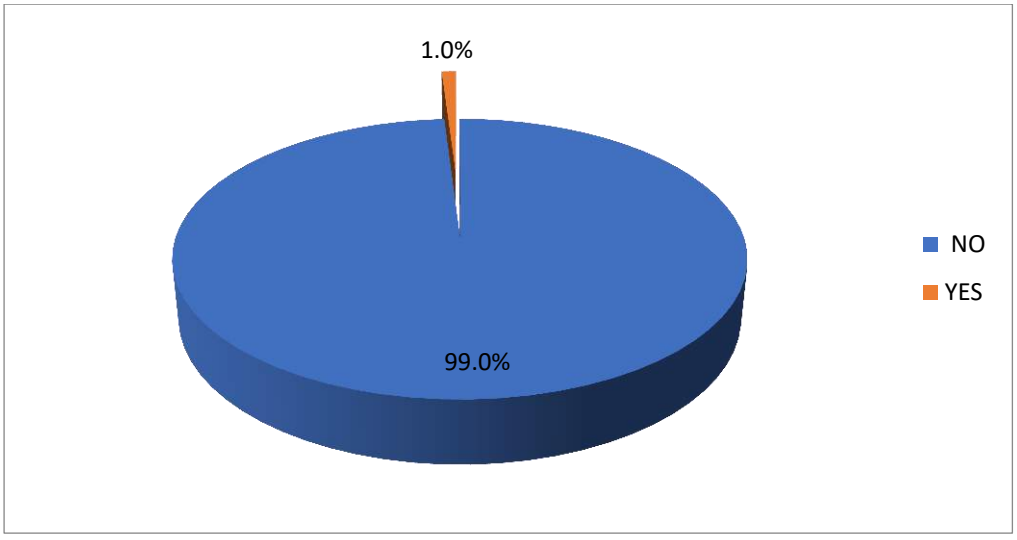
n = total number of patients %= percentage of patients

The internal maxillary artery had to be ligated in only one subject.

FIGURE XXVI

INTERNAL MAXILLARY ARTERY LIGATION

(n=100)



In our study, only 1 patient had undergone internal maxillary artery ligation.

5. SINGLE V/S MULTIPLE MODALITY:

TABLE XXVII

SINGLE V/S MULTIPLE MODALITIES

(n=100)

Number of Treatment	No. of cases	Percentage
Single	55	55.0%
Multiple	45	45.0%
Total	100	100.0%

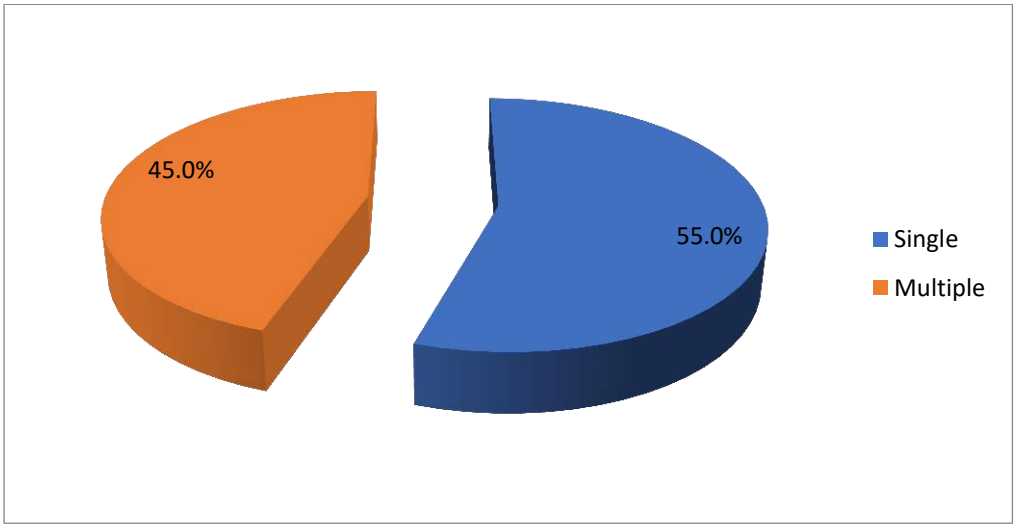
n = total number of patients %= percentage of patients

55 (55%) were managed with single modality whereas 45 (45%) had to be managed with multiple modalities.

FIGURE XXVII

SINGLE V/S MULTIPLE MODALITIES

(n=100)



6. AGE V/S MODALITY USED:

TABLE XXVIII

AGE V/S MODALITY USED

(n=100)

		No. of Treatment				Total
		Single	Single	Multiple	Multiple	
AGE GROUP	< 20	7	12.7%	2	4.4%	9
	21-30	11	20.0%	8	17.8%	19
	31-40	8	14.5%	3	6.7%	11
	41-50	4	7.3%	11	24.4%	15
	51-60	15	27.3%	7	15.6%	22
	> 60	10	18.2%	14	31.1%	24
Total		55	100.0%	45	100.0%	100

n = total number of patients %= percentage of patients

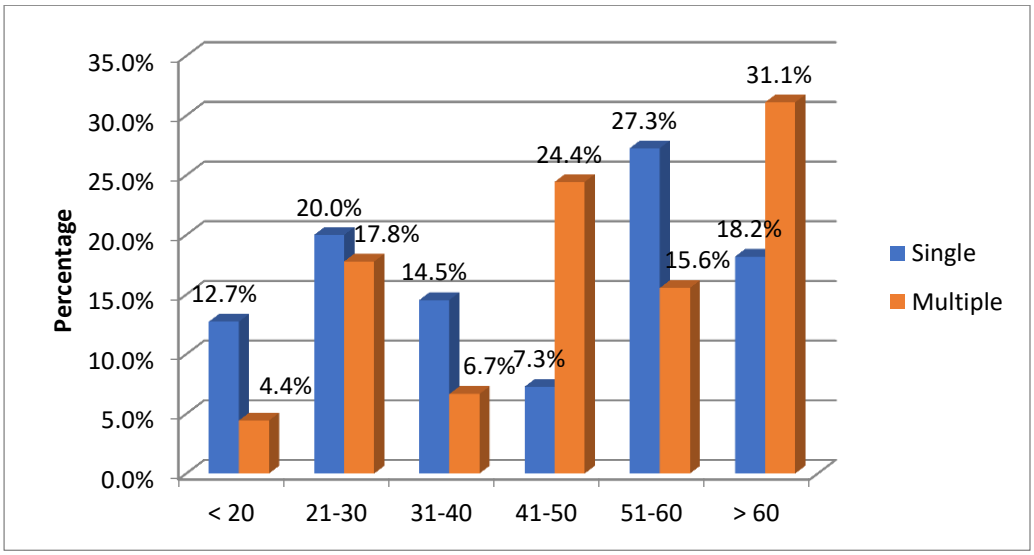
Out of patients belonging to less than 20 years of age, 12.7% were treated with single modality, whereas 4.4% were treated with multiple modalities. Patients belonging to age group 21-40, 34.5% were treated with single modality, whereas 24.5% were treated with multiple modalities.

Patients belonging to 41-60 age group, 34.6% were treated with single modality, whereas 40% were treated with multiple modalities. Patients who were more than 60 years of age, 18.2% were treated with single modality, whereas 31.1% were treated with multiple modalities.

FIGURE XXVIII

AGE V/S MODALITY USED

(n=100)



Majority of patients belonging to more than 60 year age group and 41-50 year age group had to be treated with multiple modalities, whereas patients belonging to 51-60 year age group were mostly treated with single intervention.

Maximum patients belonged to more than 60 years treated with multiple modalities (31.1%).

Minimum patients belonged to less than 20 years treated with multiple modalities (4.4%).

7. SEX V/S MODALITY USED:

TABLE XXIX
GENDER V/S MODALITY USED

(n=100)

	No. of Treatment				Total	Chi-square value	p-value
	Single	Single	Multiple	Multiple			
F	17	30.9%	17	37.8%	34	0.52	0.471
M	38	69.1%	28	62.2%	66		
	55	100%	45	100%	100		

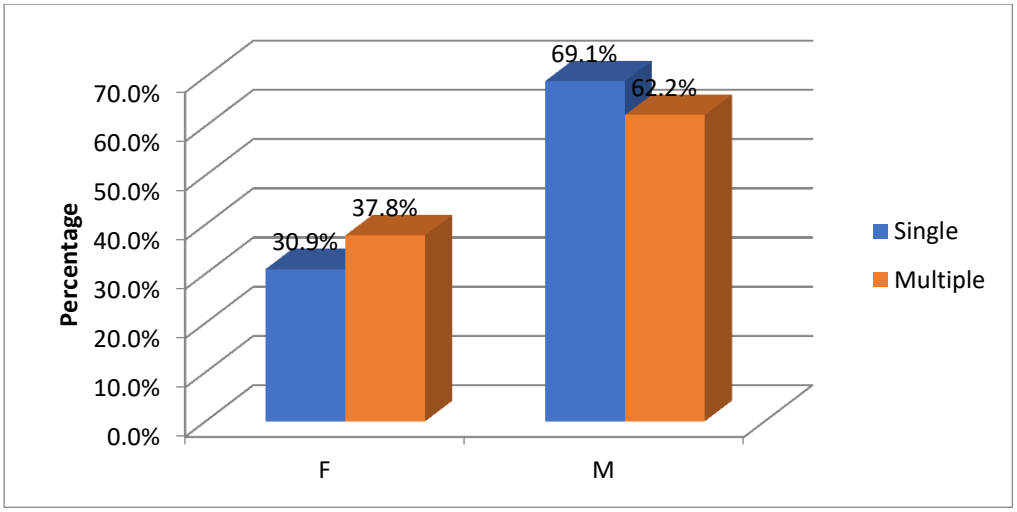
n = total number of patients %= percentage of patients

Of 34 females, 17 (30.9%) were treated with single modality while the other 17 (37.8%) were treated with multiple modalities. Out of 66 males, 38 (69.1%) were managed with single modality while 28 (62.2%) with multiple modalities.

FIGURE XXIX

GENDER V/S MODALITY USED

(n=100)



More males (69.1%) compared to females (30.9%) were treated by single modality.

8. RESIDENCE V/S MODALITY USED:

TABLE XXX

RESIDENCE V/S MODALITY USED

(n=100)

	No. of Treatment				Total	Chi-square value	p-value
	Single	Single	Multiple	Multiple			
RURAL	27	49.1%	25	55.6%	52	0.414	0.552
URBAN	28	50.9%	20	44.4%	48		
Total	55	100.0 %	45	100.0%	100		

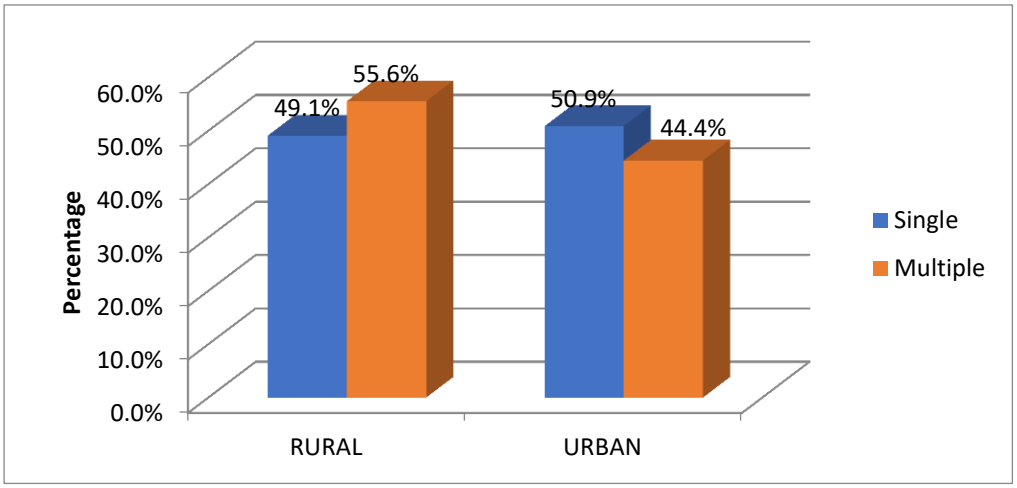
n = total number of patients %= percentage of patients

- 49.1% of patients from rural background necessitated single modality versus 44.4% patients in these areas treated with multiple modalities.
- 50.9% of patients from urban background necessitated single modality whereas 44.4% by multiple modalities.

FIGURE XXX

RESIDENCE V/S MODALITY USED

(n=100)



Population belonging to rural background needed multiple modalities (55.6%), while the urban population was treated with mostly single modality (50.9%).

9. LATERALITY V/S MODALITY USED:

TABLE XXXI
LATERALITY V/S MODALITY USED

(n=100)

	No. of Treatment				Total	Chi-square value	p-value
	Single	Single	Multiple	Multiple			
L	27	49.1%	20	44.4%	47	0.215	0.643
R	28	50.9%	25	55.6%	53		
Total	55	100.0%	45	100.0%	100		

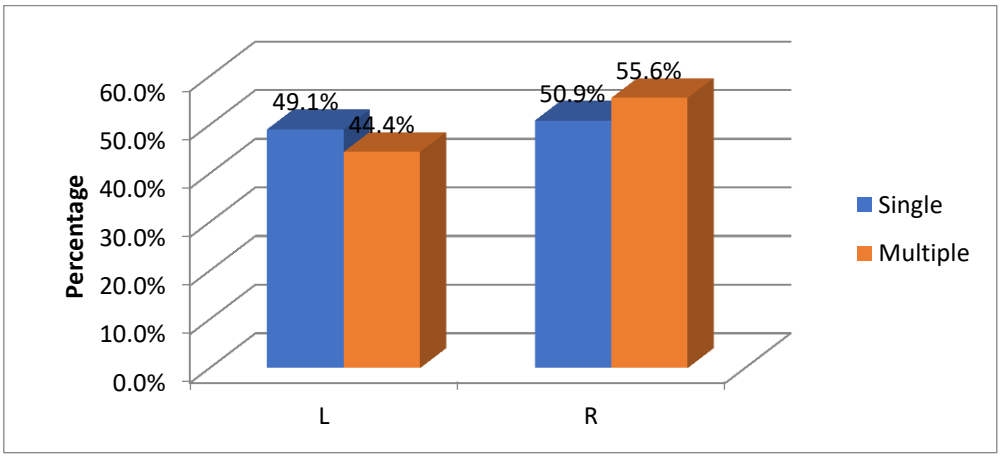
n = total number of patients %= percentage of patients

- Out of 47 patients with left sided bleed, 27 (49.1%) were treated with single modality whereas 20 (44.4%) were treated with multiple modalities.
- 53 patients had right sided bleed, out of which 28 (50.9%) were treated with single modality, while 25 (55.6%) were treated with multiple modalities.

FIGURE XXXI

LATERALITY V/S MODALITY USED

(n=100)



Left sided epistaxis was mostly treated with single modality (49.1%), and right sided was treated with multiple modalities (55.6%).

10. DURATION V/S MODALITY USED:

TABLE XXXII

DURATION V/S MODALITY USED

(n=100)

		No. of Treatment				Total	Chi-square value	p-value
		Single		Multiple				
DURATION (DAYS) GP	1	35	63.6%	35	77.8%	70	3.434	0.329
	2	6	10.9%	4	8.9%	10		
	3	2	3.6%	0	0.0%	2		
	4	12	21.8%	6	13.3%	18		
Total		55	100.0%	45	100.0%	100		

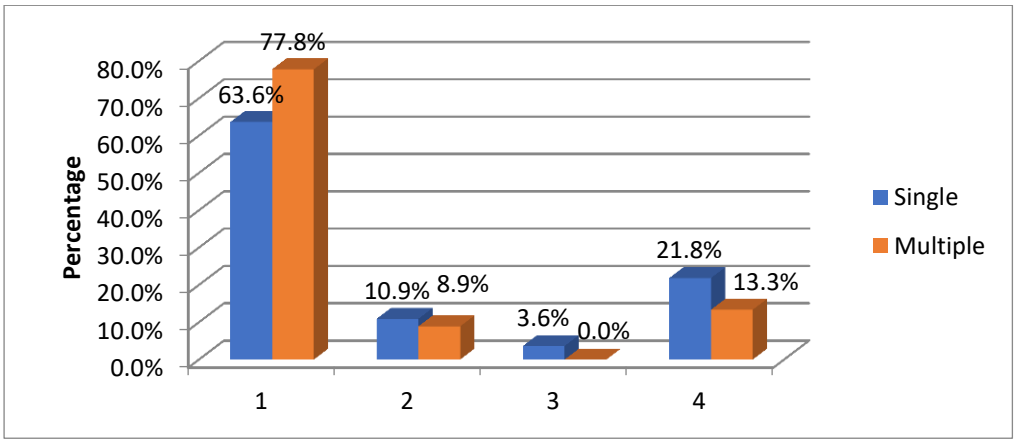
n = total number of patients %= percentage of patients

70 patients presented with 1 day history of epistaxis (group 1). Out of these, 35 (63.6%) were treated with single modality and the other 35 (77.8%) were treated with multiple modalities. 10 patients presented with 8-14 days history, with 6 of them being treated with single modality whereas 4 were treated with multiple modalities (group 2). 2 patients presenting with 14–21-day history were treated with single modality (group 3). 18 patients with more than 21-day history (group 4) of whom 12 were treated with single modality and 6 treated with multiple modalities.

FIGURE XXXII

DURATION V/S MODALITY USED

(n=100)



Maximum subjects belonged to group 1 (less than 7 days)- 70% and were treated with multiple modalities (77.8%).

Minimum subjects belonged to group 3 (15-21 days)- 2%; were mostly treated with single modality (3.6%)

11. COMORBIDITIES V/S MODALITY USED:

TABLE XXXIII

COMORBIDITIES V/S MODALITY USED

(n=100)

Co Morbidities	No. of Treatment				Total	Chi-square value	p-value
	Single	Single	Multiple	Multiple			
DIABETES	15	27.3%	9	20.0%	24	0.718	0.397
HTN	28	50.9%	33	73.3%	61		
CAD	0	0.0%	0	0.0%	0	5.231	0.025
Total	55	100.0%	45	100.0%	100		

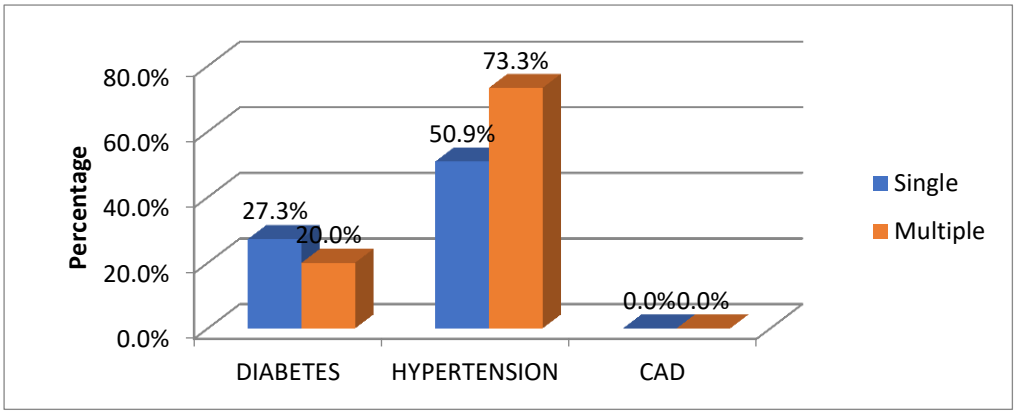
n = total number of patients %= percentage of patients

Out of 100, 61 patients were hypertensive. Out of these, 28 (50.9%) were treated with single modality whereas 33 (73.3%) were treated with multiple modalities. Among the non-hypertensives, 27 were treated with single modality and 12 were treated with multiple modalities.

FIGURE XXXIII

COMORBIDITIES V/S MODALITY USED

(n=100)



Most of the hypertensives were treated with multiple modalities (73.3%) whereas diabetics were treated with single modality (27.3%).

12. SITE OF EPISTAXIS V/S MODALITY USED:

TABLE XXXIV

SITE OF EPISTAXIS V/S MODALITY USED

(n=100)

		No. of Treatment				Total	Chi-square value	p-value
		Single	Single	Multiple	Multiple			
EPISTAXIS	ANTERIOR	40	72.7%	7	15.6%	47	32.476	0.001
	POSTERIOR	15	27.3%	38	84.4%	53		
Total		55	100.0%	45	100.0%	100		

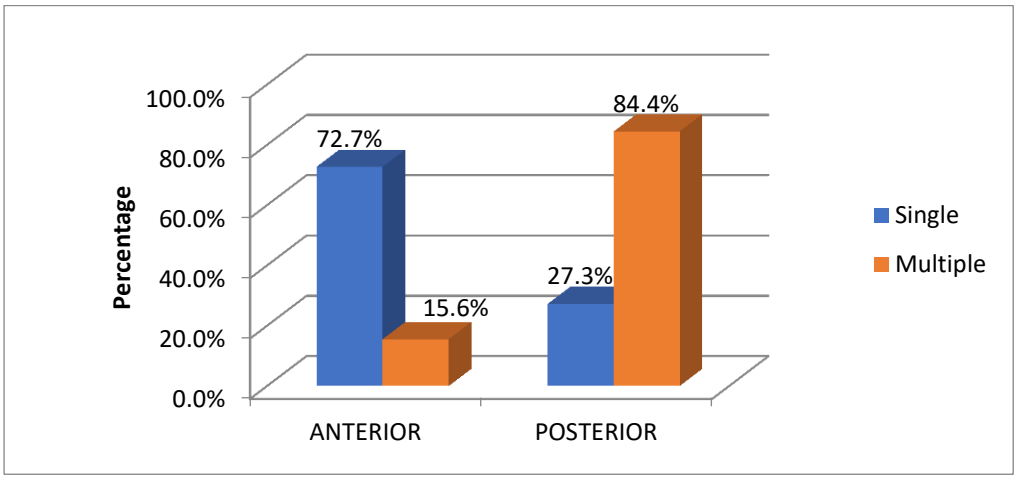
n = total number of patients %= percentage of patients

47 patients with anterior epistaxis, 40 were treated with single modality whereas 7 were treated with multiple modalities. 53 patients with posterior epistaxis, only 15 were treated with single modality while 38 required multiple modalities.

FIGURE XXXIV

SITE OF EPISTAXIS V/S MODALITY USED

(n=100)



Most of the posterior bleed was treated by multiple intervention whereas (84.4%) anterior bleed was treated with single intervention (72.7%).

13. MEAN AGE:

TABLE XXXV
MEAN AGE

(n=100)

	Single	Multiple
	Mean	**Mean**
AGE	41.80	49.76

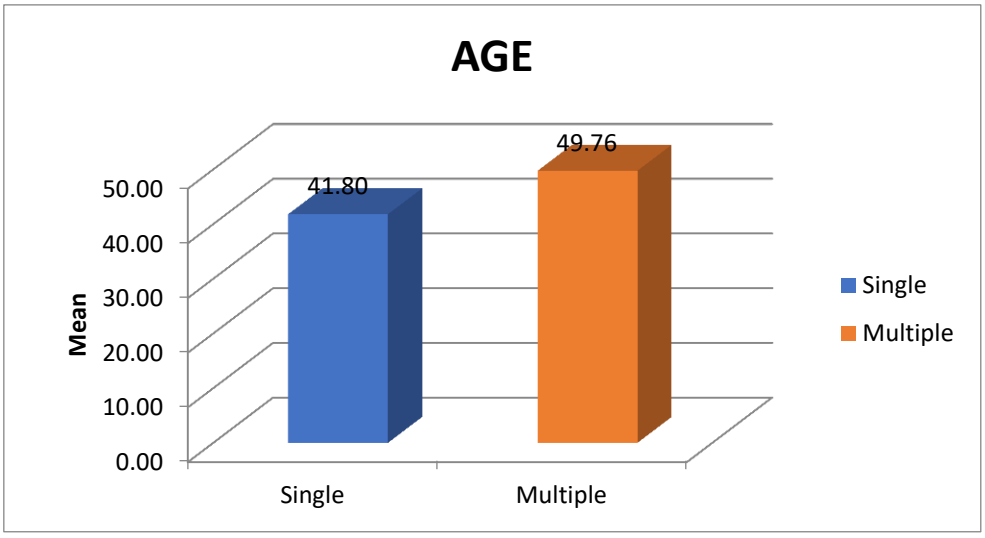
n = total number of patients %= percentage of patients

The mean age of patients treated with single modality is 41.8 years while treated with multiple modalities is 49.76.

FIGURE XXXV

MEAN AGE

(n=100)



Mean age was 49.76 years for multiple modalities whereas 41.8 for single modality.

14. MEAN DURATION OF EPISTAXIS:

TABLE XXXVI

MEAN DURATION

(n=100)

	Single	Multiple
	Mean	Mean
DURATION (DAYS)	14.69	8.87

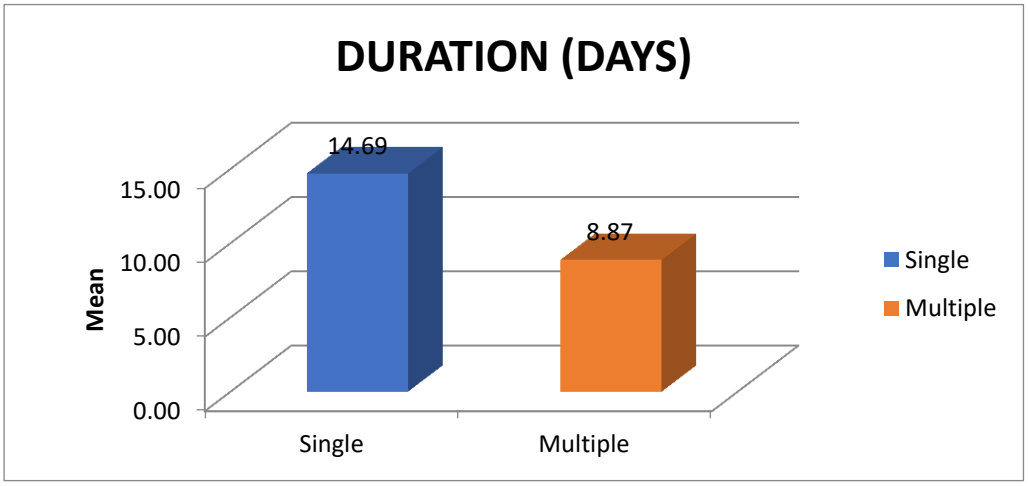
n = total number of patients %= percentage of patients

It is 14.69 days for single modality while 8.87 days for multiple modalities.

FIGURE XXXVI

MEAN DURATION

(n=100)



Patients presenting at 2 weeks with epistaxis can be controlled by utilising a single therapeutic modality while those presenting within the first week needed multiple modalities.

15. MEAN BLOOD PRESSURE:

TABLE XXXVII

MEAN BLOOD PRESSURE

(n=100)

	Single	Multiple
	Mean	Mean
SBP	140.91	151.33
DBP	89.82	96.38

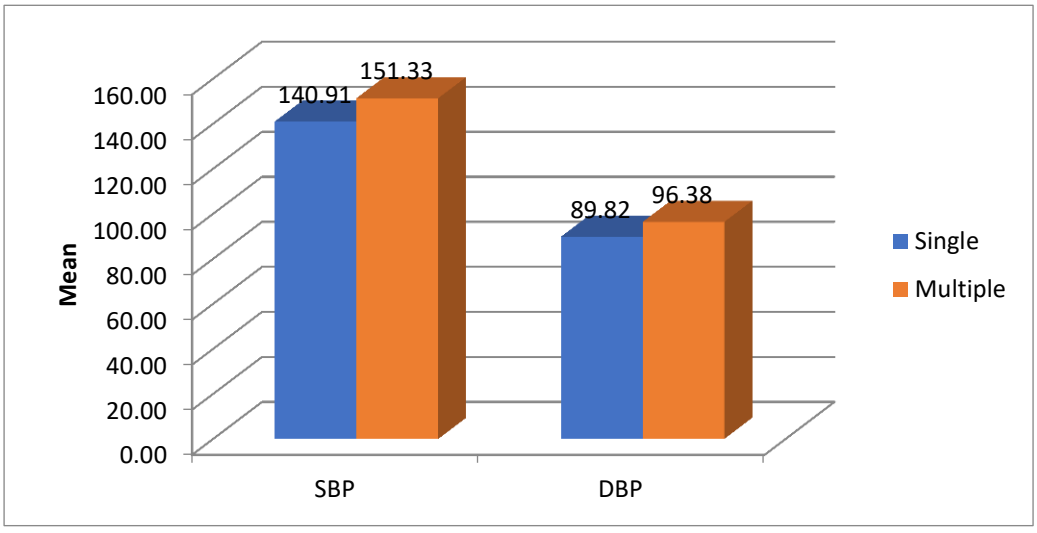
n = total number of patients %= percentage of patients

The mean systolic BP for single modality was 140.91 mmHg, as for multiple modalities were 148.44 mmHg. The mean diastolic BP was 89.82 mmHg for single modality but 93.04 mmHg for multiple modalities.

FIGURE XXXVII

MEAN BLOOD PRESSURE

(n=100)



Mean systolic/ diastolic blood pressure for single modality was 140.91/89.82 mm Hg and for multiple modalities was 151.33/96.38 mm Hg.

H. FOLLOW UP:

1. AT 7 DAYS:

TABLE XXXVIII

7TH DAY FOLLOW UP

		No. of Treatment				Total	Chi-square value	p-value
7DAY		Single	Single	Multiple	Multiple			
Crusting	N	28	50.9%	37	82.2%	65	10.667	0.001
	Y	27	49.1%	8	17.8%	35		
Bleeding	N	49	89.1%	44	97.8%	93	2.869	0.125
	Y	6	10.9%	1	2.2%	7		
Synechiae	N	55	100.0%	45	100.0%	100		

(n=100)

n = total number of patients %= percentage of patients

On first follow up, number of patients who had crusting was 35, out of which 27 belonged to group treated with single modality, and 8 treated with multiple modalities. Out of the 65 with no crusting, 28 were treated with single modality and 37 treated with multiple modalities.

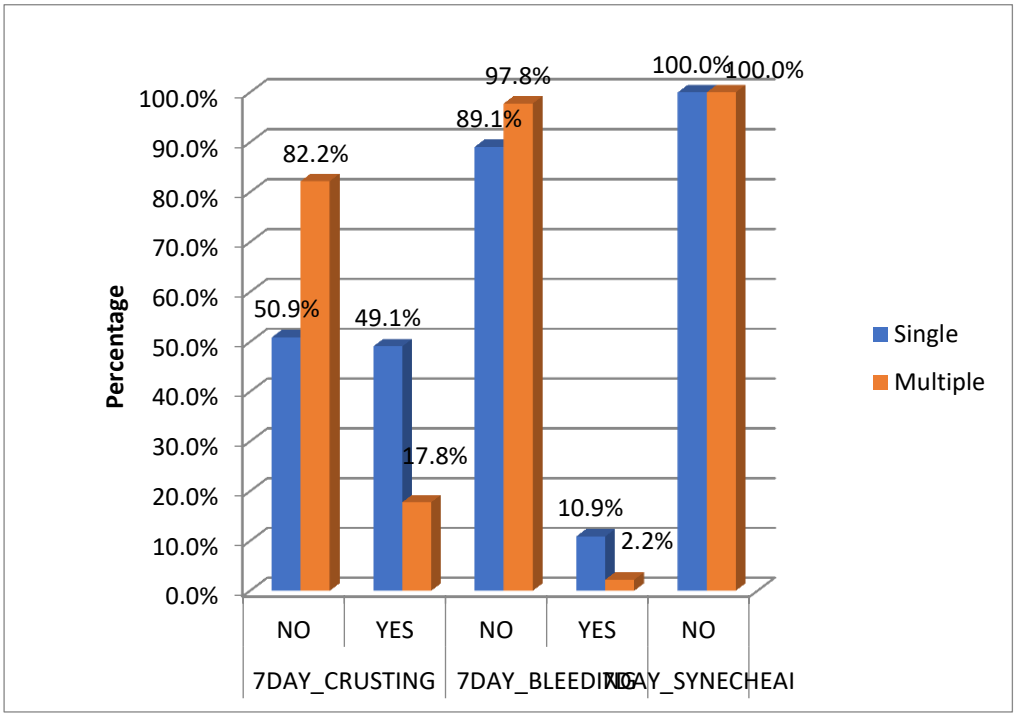
Out of 100 patients, 7 had bleeding episodes, whereas 93 had no bleed. Out of the 7, 6 were treated with single intervention, and 1 was treated with multiple interventions. Of the 93, 49 were treated with single modality, 44 were treated with multiple modalities.

No patients had synechiae on the first follow up.

FIGUIRE XXXVIII

7TH DAY FOLLOW UP

(n=100)



Mostly patients presented with crusting than bleeding on the first follow up. There was no synechiae seen.

2. AT DAY 14:

TABLE XXXIX

14TH DAY FOLLOW UP

(n=100)

		No. of Treatment				Total	Chi-square value	p-value
14DAY		Single	Single	Multiple	Multiple			
CRUSTING	N	37	72.5%	35	79.5%	72	0.63	0.427
	Y	14	27.5%	9	20.5%	23		
BLEEDING	N	38	74.5%	43	97.7%	81	10.134	**0.001**
	Y	13	25.5%	1	2.3%	14		
SYNECHIAE	N	47	92.2%	38	86.4%	85	0.842	0.359
	Y	4	7.8%	6	13.6%	10		

n = total number of patients %= percentage of patients

On the 2nd follow up at 14th day, 5 patients did not come for follow up. Number of patients who had crusting was 23, out of which 14 belonged to group treated with single modality, and 9 treated with multiple modalities. Out of the 72 with no crusting, 37 were treated with single modality and 35 treated with multiple modalities.

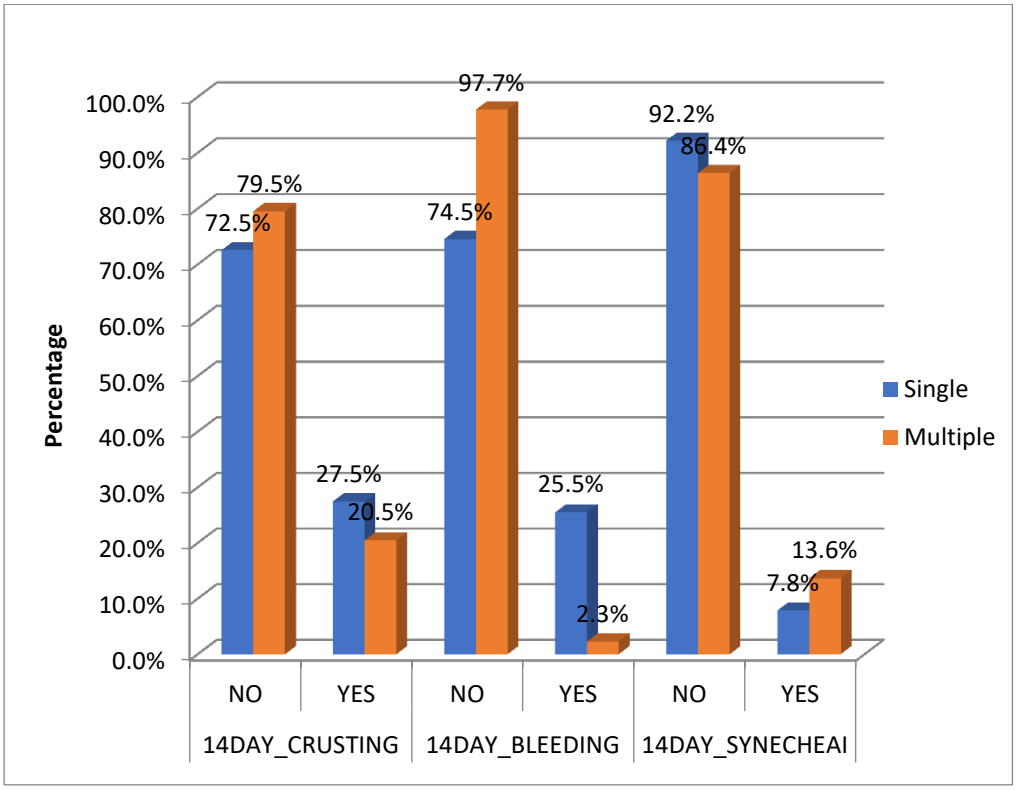
Out of 95 patients, 14 had bleeding episodes, whereas 81 had no bleed. Out of the 14, 13 were treated with single intervention, and 1 was treated with multiple interventions. Of the 81, 38 were treated with single modality, 43 were treated with multiple modalities.

10 patients had synechiae on the second follow up. Out of these 10, 4 were treated with single modality and 6 were treated with multiple modalities. 85 had no synechiae – 47 had single treatment, and 38 had multiple treatments.

FIGURE XXXIX

14TH DAY FOLLOW UP

(n=100)



Crusting dominated at second follow up followed by bleeding. Some of the patients had synaechiae formation.

3. AT 1 MONTH:

TABLE XL

1ST MONTH FOLLOW UP

(n=100)

		No. of Treatment				Total	Chi-square value	p-value
1MONTH		**Single**	**Single**	**Multiple**	**Multiple**			
CRUSTING	N	40	81.6%	35	79.5%	75	0.065	0.799
	Y	9	18.4%	9	20.5%	18		
BLEEDING	N	37	75.5%	42	95.5%	79	7.211	**0.009**
	Y	12	24.5%	2	4.5%	14		
SYNECHIAE	N	35	71.4%	28	63.6%	63	0.644	0.422
	Y	14	28.6%	16	36.4%	30		

n = total number of patients %= percentage of patients

On third follow up at 1 month, 93 patients turned up. Number of patients who had crusting was 18, out of which 9 belonged to group treated with single modality, and 9 treated with multiple modalities. Out of the 75 with no crusting, 40 were treated with single modality and 35 treated with multiple modalities.

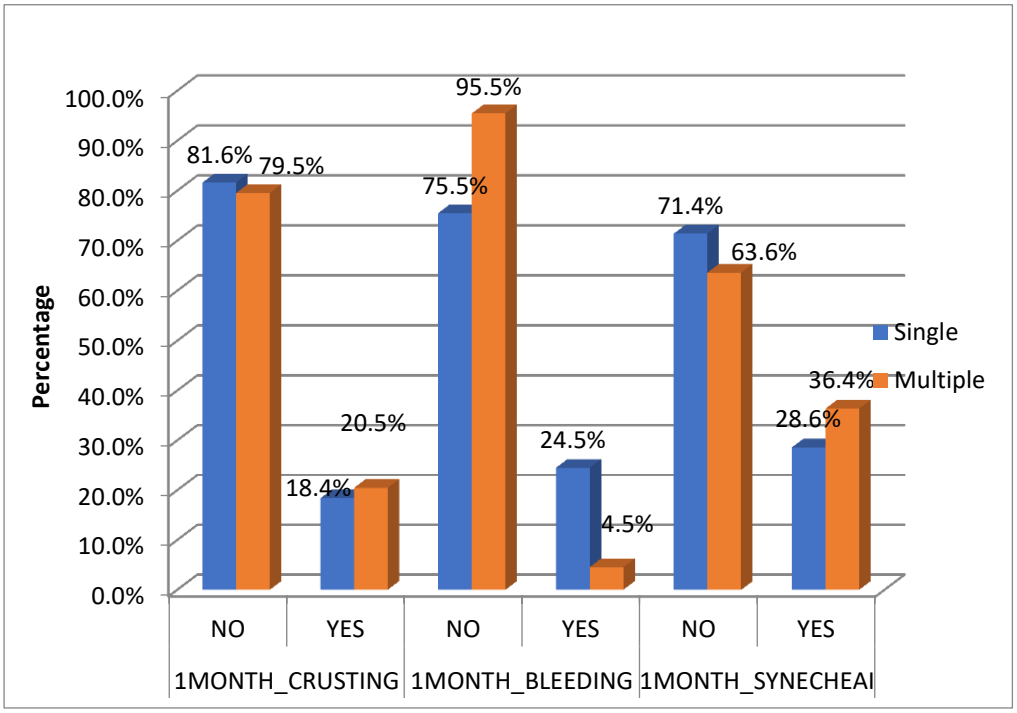
Out of 93 patients, 14 had bleeding episodes, whereas 79 had no bleed. Out of the 14, 12 were treated with single intervention, and 2 was treated with multiple intervention. Of the 79, 37 were treated with single modality, 42 were treated with multiple modalities.

30 patients had synechiae on the third follow up. Out of 30 – 14 were treated with single modality, and 16 with multiple modalities. 63 had no synechiae – 35 with single treatment and 28 with multiple treatment.

FIGURE XL

1ST MONTH FOLLOW UP

(n=100)



On the third follow up, there were more synechiae formation followed by crusting. There was minimal bleeding.

4. COMPARISON OF DIFFERENT MODALITIES AT DAY 7:

TABLE XLI

COMPARISON OF DIFFERENT MODALITIES ON FIRST FOLLOW UP

(n=100)

		Treatment					Total	Chi-square value	p-value
7DAY		**ESPAL**	**NP**	**NP/ESPAL**	**SC**	**SC/NP**			
CRUSTING	N	8	17	36	3	1	65	60.426	**0.001**
	Y	4	1	2	22	6	35		
BLEEDING	N	12	13	38	24	6	93	16.617	**0.002**
	Y	0	5	0	1	1	7		
SYNECHEAI	N	12	18	38	25	7	100		
Total		12	18	38	25	7	100		

n = total number of patients %= percentage of patients

Out of 65 with no crusting, 8 were treated with sphenopalatine artery ligation alone, 17 with nasal packing, 36 with nasal packing/sphenopalatine artery ligation, 3 with septal cauterisation, and 1 with septal cauterisation/nasal packing. Out of 35 with crusting, 4 treated with sphenopalatine artery ligation, 1 with nasal packing, 2 with nasal packing/sphenopalatine artery ligation, 22 with septal cauterisation, 6 with septal cauterisation/ nasal packing.

For post op bleeding, 93 had no bleed: 12 with sphenopalatine artery ligation, 13 with nasal packing, 38 with nasal packing/sphenopalatine artery ligation, 24 with septal cauterisation and 6 with septal cauterisation/nasal packing. 7 had an episode of bleeding: which was 0

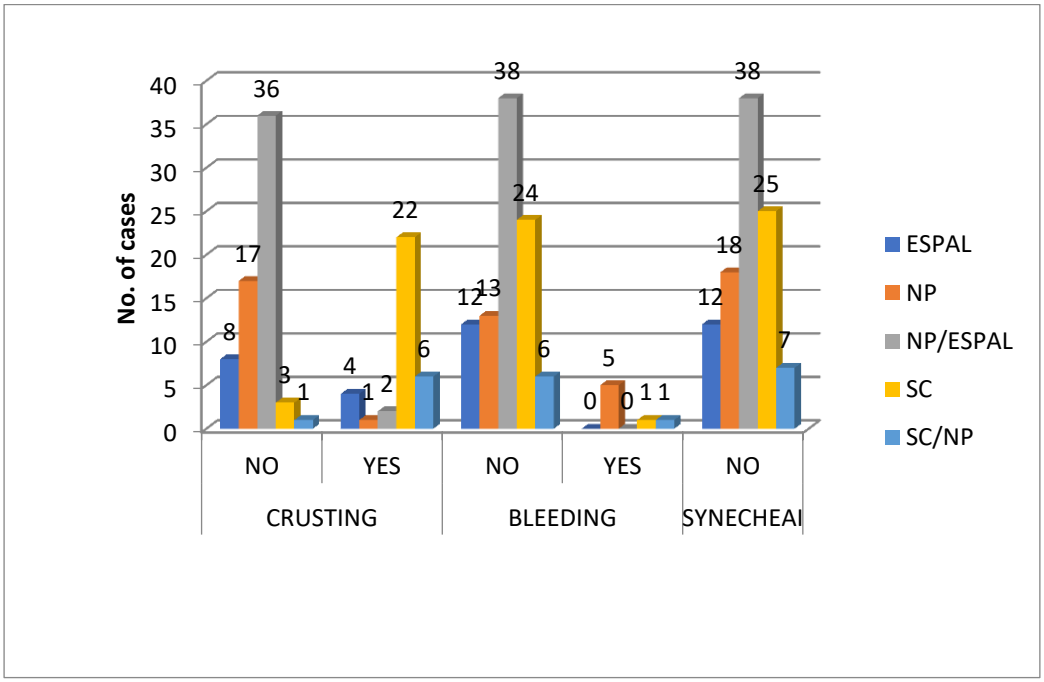
with sphenopalatine artery ligation, 5 with nasal packing, 0 with nasal packing/sphenopalatine artery ligation, 1 with septal cauterisation, 1with nasal packing/septal cauterisation.

There were no synechiae formations at post op day 7.

FIGURE XLI

COMPARISON OF DIFFERENT MODALITIES ON FIRST FOLLOW UP

(n=100)



5. COMPARISON OF DIFFERENT MODALITIES AT DAY 14:

TABLE XLII

COMPARISON OF DIFFERENT MODALITIES AT SECOND FOLLOW UP

(n=100)

		Treatment					Total	Chi-square value	p-value
14DAY		**ESPAL**	**NP**	**NP/ ESPAL**	**SC**	**SC/NP**			
CRUSTING	N	10	15	32	12	3	72	20.308	**0.001**
	Y	2	0	5	12	4	23		
Total		12	15	37	12	7	95		
BLEEDING	N	11	8	37	19	6	81	19.668	**0.001**
	Y	1	7	0	5	1	14		
Total		12	15	37	12	7	95		
SYNECHIAE	N	9	15	32	23	6	85	5.92	0.205
	Y	3	0	5	1	1	10		
Total		12	15	37	24	7	95		

n = total number of patients %= percentage of patients

Out of 72 with no crusting, 10 were treated with sphenopalatine artery ligation alone, 15 with nasal packing, 32 with nasal packing/sphenopalatine artery ligation, 12 with septal cauterisation, and 4 with septal cauterisation/nasal packing. Out of 23 with crusting, 2 treated with sphenopalatine artery ligation, 0 with nasal packing, 5 with nasal packing/sphenopalatine artery ligation, 12 with septal cauterisation, 4 with septal cauterisation/ nasal packing.

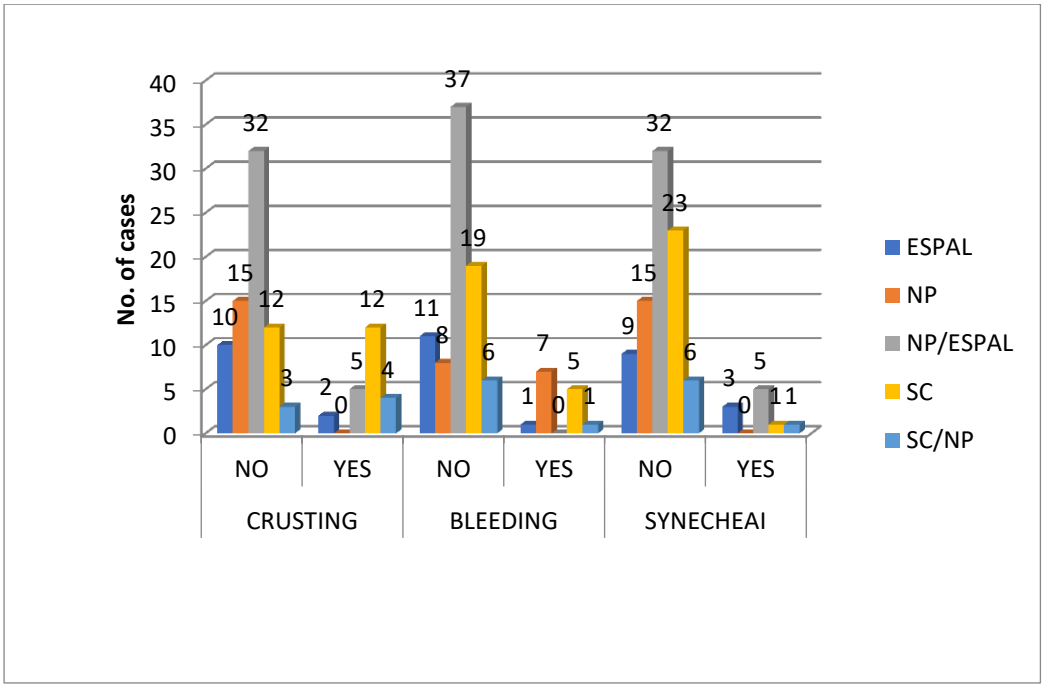
For post op bleeding, 81 had no bleed: 11 with sphenopalatine artery ligation, 8 with nasal packing, 37 with nasal packing/sphenopalatine artery ligation, 19 with septal cauterisation and 6 with septal cauterisation/nasal packing. 14 had an episode of bleeding: which was 1 with sphenopalatine artery ligation, 7 with nasal packing, 0 with nasal packing/sphenopalatine artery ligation, 5 with septal cauterisation, 1 with nasal packing/septal cauterisation.

85 patients had no synechiae formation. 10 had synechiae: 3 with sphenopalatine artery ligation, 0 with nasal packing, 5 with nasal packing/sphenopalatine artery ligation, 1 with septal cauterisation, 1 with nasal packing/septal cauterisation.

FIGURE XLII

COMPARISON OF DIFFERENT MODALITIES AT SECOND FOLLOW UP

(n=100)



6. COMPARISON OF DIFFERENT MODALITIES AT 1 MONTH:

TABLE XLIII

COMPARISON OF DIFFERENT MODALITIES AT THIRD FOLLOW UP

(n=100)

		Treatment					Total	Chi-square value	p-value
1MONTH		**ESPAL**	**NP**	**NP/ESPAL**	**SC**	**SC/NP**			
CRUSTING	N	10	14	30	16	5	75	5.610	0.230
	Y	2	0	7	7	2	18		
Total		12	14	37	23	7	93		
BLEEDING	N	11	6	36	20	6	79	24.308	**0.001**
	Y	1	8	1	3	1	14		
Total		12	14	37	23	7	93		
SYNECHIAE	N	7	14	26	14	2	63	12.673	**0.013**
	Y	5	0	11	9	5	30		
Total		12	14	37	23	7	93		

n = total number of patients %= percentage of patients

Out of 75 with no crusting, 10 were treated with sphenopalatine artery ligation alone, 14 with nasal packing, 30 with Nasal packing/sphenopalatine artery ligation, 16 with septal cauterisation, and 5 with septal cautery/nasal packing. Out of 18 with crusting, 2 treated with sphenopalatine artery ligation, 0 with nasal packing, 7 with nasal packing /sphenopalatine artery ligation, 7 with septal cauterisation, 2 with septal cauterisation /nasal packing.

For post op bleeding, 79 had no bleed: 11 with sphenopalatine artery ligation, 6 with nasal packing, 36 with nasal packing/ sphenopalatine artery ligation, 20 with septal cauterisation and 6 with septal

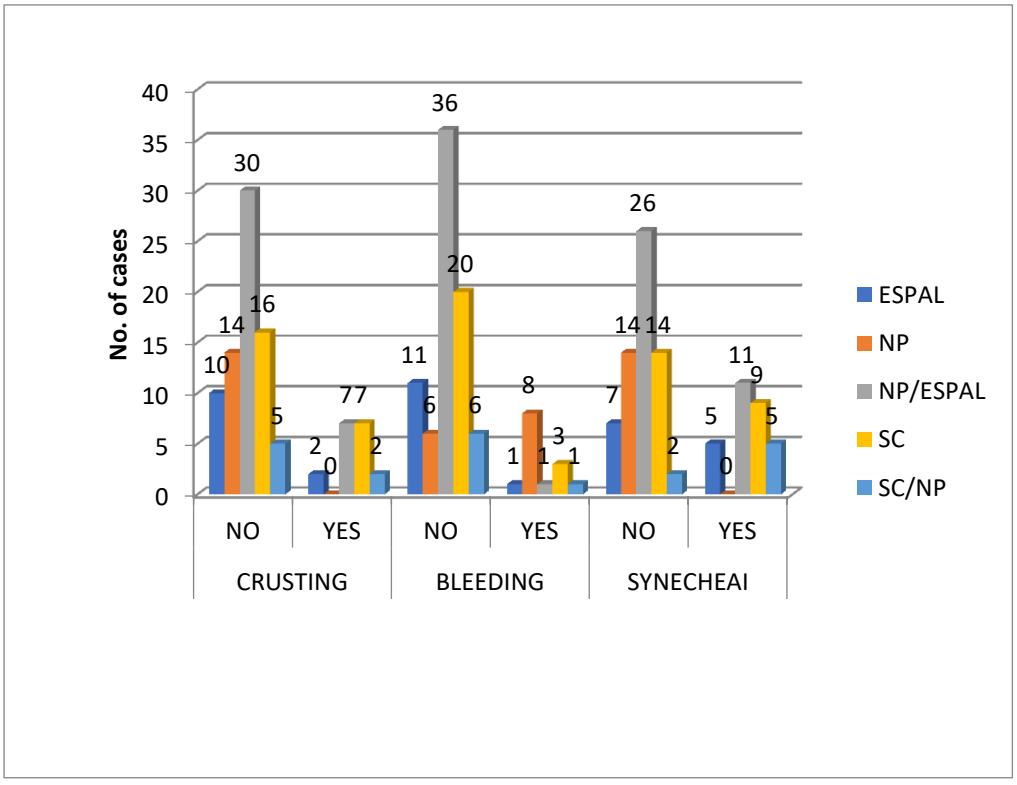
cauterisation/nasal packing. 14 had an episode of bleeding: which was 1 with sphenopalatine artery ligation, 8 with nasal packing, 1 with nasal packing/ sphenopalatine artery ligation, 3 with septal cauterisation, 1 with nasal packing/septal cauterisation.

63 patients had no synechiae formation. 30 had synechiae: 5 with sphenopalatine artery ligation, 0 with nasal packing, 11 with nasal packing/ sphenopalatine artery ligation, 9 with septal cauterisation, 5 with nasal packing/septal cauterisation.

FIGURE XLIII

COMPARISON OF DIFFERENT MODALITIES AT THIRD FOLLOW UP

(n=100)



DISCUSSION

- **Demographic profile:**

i. AGE:

The present study included 100 patients with epistaxis. The mean age of patients was 45.38 ± 18.89 years with age ranging between 6-85 years. 28% were less than 30 years. Chaaban et al.[77] reported an increase in rate of epistaxis with increasing age. He concluded that patients in 66–76 and, 76–85 age group, and more than 85 years old had 1.36 (95% confidence interval [95% CI], 1.23-1.50), 2.37 (95% CI, 2.14-2.62), and 3.24 (95% CI, 2.91-3.62) times higher odds of presenting with epistaxis, respectively, than patients under 65.

Our results were consistent with this study as with increasing age, numbers of patients with epistaxis were higher. Highest being 24% in more than 60 years age group. Majority of patients in the 51–70 age range had comorbidities including hypertension, which is a significant risk factor for epistaxis. This could account for the preponderance of patients in this age range.

Our data is also supported by Tunkel et al[78] analysis which concluded the mean age was 53.4 years of patients presenting with epistaxis in emergency department, with 52.7% of them being males.

Elderly individuals frequently experience epistaxis, and the severity of the condition is influenced by age-related changes in the vascular architecture, such as atherosclerosis, dryness and local trauma. Most epistaxis in the elderly begin anteriorly.

In the present study, with increasing age, epistaxis had to be treated with multiple modalities instead of single modality. Subjects less than 20 years were mostly managed by single modality (7 out of 9). But with increasing age, the use of multiple modalities increased as single modality was not effective. In subjects more than

60 years of age, 58.3% had to be managed with more than one treatment.

ii. GENDER:

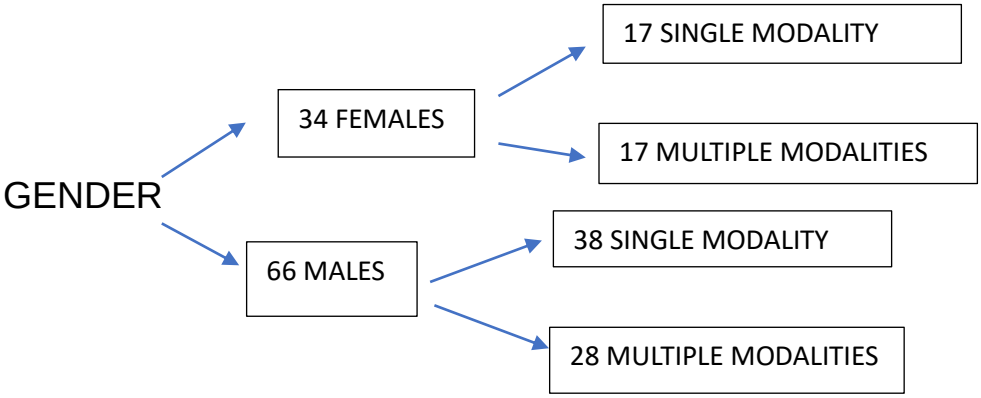
In the present study, 34% of patients were female while 66% of patients were male. Our results coincide with Kallenbach et al[79] study that noted that compared to women (28 per 100,000), men had a higher incidence (42 per 100,000). They suggested that for patients above 70 years of age, this gender disparity became very noticeable. Patients over 45 years of age had a steadily rising incidence for both sexes, with a sharp rise for those over 70 years of age. With an incidence of 222 per 100,000 people, men over 85 had the highest incidence.

After analysing the results, we conclude that as the age increased, more males were affected by epistaxis than females, i.e. in age group 31-40, 5.9% were females while 13.6% were males. Similarly, in 41-50, 11.8% were females, while 16,7% were males. This difference was not found after 50 years of age: 51-60 age group, 38.2% were females, 13.67% were males and >60 years, 26.5% were females while 22.7% were males.

This is supported by Corte et al.[80] study. They concluded that up until the age of 49, when gender distribution equalizes, men are primarily affected by epistaxis. This occurrence has been related to the preventive action of oestrogen in females, either through the prevention of vascular disease in general or the promotion of a healthy nasal mucosa.

In our study, out of 34 females, 17 were managed by single modality and the rest were managed by multiple modalities. Thus, both modalities worked for the female sex. For males, 38 were managed by single modality whereas 28 were managed by multiple

modalities. Thus, we conclude that there is no correlation between sex and the type of modality used.



In our study, there were 5 pregnant females with epistaxis which was exclusively anterior. Sobol et al.[81] concluded that pregnancy-related epistaxis is predisposed by a number of factors. Specifically, the increased vascularity of the nasal mucosa due to the raised oestrogen levels may intensify and prolong the bleeding.

Due to cardiovascular compensation, progesterone increases blood volume, which worsens vascular congestion and bleeding as well as conceal blood loss in the event of severe epistaxis. Vasodilation is one of the systemic effects of placental growth hormone. Vascular, inflammatory, and immunological alterations are indirect hormonal effects that may exacerbate the risk of nasal hypersensitivity and, thereby, conditions like nasal granuloma gravidarum. Nasal bleeding usually halts right away after delivery or foetal death because some of the underlying reasons, like congestion and hyperaemia recede.

In our study, 3 out of 5 pregnant women required superficial septal cauterisation whereas 2 were managed by nasal packing only, therefore lowering the need for sphenopalatine artery ligation and subsequent effect of general anaesthesia on the foetus.

iii. RESIDENCE:

52% of our patients with epistaxis came from rural, whereas 48% came from urban background. The findings are consistent with Ruhela et al.[82] study in which 73% epistaxis subjects belonged to rural area. Our centre is a tertiary care facility, it receives referrals other departments and local practitioners.

49.1% of patients presenting with epistaxis belonged to rural areas whereas 50.9% belonged to urban areas were treated with single modality. This ratio was reversed for multiple modalities, where 55.6% were belonging to rural areas and 44.4% belonged to urban areas.

iv. EDUCATION:

In the present study, most of the patients belonged to higher socioeconomic group (61%). 39% of the patients belonged to lower socioeconomic group. Our study compares with Pourya et al.[83] analysis which recorded higher incidence of epistaxis in the higher socioeconomic status group. They suggested that people with higher socioeconomic status seek out and receive therapy more frequently and sooner than people with lower socioeconomic status.

In the higher socioeconomic status group, 31% were treated with single modality whereas 30% treated with multiple modalities. 12% belonging to poor socioeconomic status group were managed with single modality while rest by multiple modalities.

- **Clinical profile:**

i. LATERALITY:

In our study, 47% had bleed from the left side whereas 53% from the right side. There is no literature on more involvement of one side as epistaxis can occur from any side.

In our study, out of the 47% left sided bleed, 49.1% were treated with single modality while out of the 53% with right sided bleed, 50.9% necessitated single modality. 44.4% of left sided bleed and 55.6% of right sided bleed necessitated multiple modalities. The p-value here is 0.643. Thus, there is no correlation between epistaxis and the side of nose.

On comparison of the laterality with age, it was noted that with age advancement, there was no difference between the side of bleed and age. With increasing age, epistaxis can occur from either side (2.1% left sided and 15.1% right sided in <20 years whereas, 21.3% left sided and 26.4% right sided in >60 years age group).

ii. DURATION:

Our study included patients with respect to duration of epistaxis. Most of the patients (70%) presented with epistaxis within 7 days of primary intervention (group 1), 10% of patients presented within 8 -14 days (group 2), 2% within 15 – 21 days (group 3). 18% of patients had history of epistaxis of more than 3 weeks (group 4). The duration of presentation ranged from 1 -90 days with mean of 12.07± 17.79 days. Therefore, most had an acute presentation that is within a week of epistaxis and received intervention accordingly.

Out of the 70 who presented within a week (group 1), 35 were treated with single modality whereas the other 35 required multiple treatments. Patients belonging to group 2, 6 were treated with single intervention while the other 4 required multiple interventions. Group 3 consists of patients presenting with epistaxis from 15-21 days: only 2 patients belonged to this group who were treated with single

intervention. Group 4 consists of 18 patients, 12 were treated with single modality, and 6 were treated with multiple interventions.

iii. NASAL BLOCKAGE:

In our study, only 26 % had nasal blockage, rest had no symptoms except epistaxis. Most of these patients had either septal deviations or bony spur on anterior rhinoscopy.

Fatakia et al.[84] suggest that septal deviations, bony spurs, and fractures are structural abnormalities in the nose that can increase the likelihood of nose bleeds (epistaxis) in patients. These obstructions disrupt normal airflow, leading to turbulent airflow in front of these blockages. This turbulence dries out the nasal mucosa, making it more susceptible to damage and nosebleeds. Additionally, severe deviations or spurs can directly injure the mucosa of the lateral nasal wall.

- **Comorbidities:**

i. DIABETES:

Our study also compares patients of epistaxis with respect to their diabetic status. Among the 100 patients, 76% were non diabetic while 24% were diabetic and 55 were treated with single modality. Out of the 55, 40 (72.7%) were non diabetic whereas 15 (27.3%) were diabetic. The remaining 45 patients which required multiple modality therapy, 36 (80%) were non diabetic and 9 (20%) were diabetic. p- value is 0.397. Therefore, in our study there is no correlation with the type of modality and diabetic status.

Our study correlates with Loth et al.[85] which compared the nasal mucosal blood flow in diabetic patients and found no correlation between the duration of diabetes and blood flow and summarised that blood flow is not affected by diabetic status. Tthus, we could not find any correlation between diabetes and epistaxis.

ii. HYPERTENSION:

The correlation between hypertension and epistaxis was found to be significant in the present study (p-value = 0.025). Only 39% of subjects were non hypertensives, whereas 61% were hypertensives.

In the non-hypertensive group, 27 were treated with single modality and 12 with multiple modalities. For patients who were hypertensive, 28 needed single intervention, whereas 33 multiple modalities. This implies that as the blood pressure increased, there was a need for more than one intervention to control the bleed. On data analysis, the necessity for multiple modalities was only 26.7% for non-hypertensives but rose to 73.3% for hypertensives.

The mean systolic blood pressure was 140.91 ± 21.97 for single modality and 151.33± 13.82 for multiple modalities implying as the systolic blood pressure increased, the need to treat with multiple interventions arose (p-value = 0.009). The mean diastolic blood pressure for single modality was 89.82 ± 13.67 and for multiple modalities was 96.38 ± 10.68 with p- value= 0.010. This implies that as the diastolic blood pressure increased, the epistaxis could not be controlled by single intervention and therefore, we had to go for more than one intervention.

Regarding the relation of hypertension and risk of epistaxis, two factors should be emphasized. First, persistent vascular conditions such as the damage to organs caused by hypertension could contribute to the development of epistaxis. Evidence suggests that prolonged hypertension may elevate the likelihood of experiencing epistaxis, primarily due to its known effects on blood vessels, including atherosclerosis, dysfunction of the endothelium, and rupture. Moreover, a postmortem study indicated that hypertension might result in vascular damage within the nasal region, characterized by degenerative fibrous alterations and increased fragility of blood vessels. Individuals with a history of hypertension and epistaxis may exhibit more extensive

damage to the arterial walls in the nasal cavity compared to those experiencing epistaxis without hypertension.

Secondly, it's important to take into account the influence of anxiety when exploring the link between hypertension and epistaxis. Anxiety among patients experiencing bleeding, along with the associated increase in adrenergic activity, could potentially lead to elevated blood pressure levels. These heightened blood pressure levels might worsen prolonged epistaxis.

Our data is supported by the meta-analysis conducted by Min et al.[86] Their research findings indicate a significant correlation between hypertension and the likelihood of experiencing epistaxis. Nevertheless, it's important to note that this association doesn't definitively establish a causal relationship between hypertension and epistaxis. According to their study, epistaxis is more prevalent in men compared to women, and their occurrence tends to rise with age. In adult patients with idiopathic epistaxis, higher systolic blood pressure (SBP) may serve as an independent risk factor for persistent epistaxis. However, uncontrolled hypertension is linked to a greater frequency of epistaxis episodes compared to the individuals with normal blood pressure. Additionally, elevated blood pressure poses challenges in the management of epistaxis.

iii. SMOKING:

In our study, we correlated epistaxis and smoking status. Out of 100, 74 patients were non-smokers whereas 26 patients were smokers. Out of the non-smokers, 40 were treated with single modality whereas 34 were treated with multiple modalities. Similarly, out of smokers, 15 were treated with single modality and 11 by multiple modalities. Therefore, we found no correlation between epistaxis and smoking. Also, we found no correlation between the type of modality used to control bleeding for both groups (p -value = 0.748).

This finding is supported by study conducted by Li et al[87] who also found no correlation between smoking and epistaxis.

According to their study, the bleeding group and the control group exhibited notable distinctions in sex, drinking habits, hypertension, and hyperlipidaemia, but there were no apparent links with smoking, diabetes, cardiovascular and cerebrovascular incidents, or the usage of anticoagulant medications.

iv. ALCOHOL:

There was no correlation between alcohol and epistaxis. According to our study, 81% were non-alcoholic whereas 19% were alcoholic. Out of the 81, 43 were treated with single modality and 38 by multiple modalities. In the alcoholic group, only 12 were treated with single modality and 7 with multiple modalities.

This is in contrast to the study of by Li et al[87] who noted a correlation between epistaxis and drinking habits. In their study, among individuals aged 26-40, there was an association observed with alcohol intake and hypertension with epistaxis.

- **LOCAL EXAMINATION:**

i. ANTERIOR RHINOSCOPY:

In our study, 46 patients presented with pack in situ who had to be treated with another modality indicating thereby packing was not adequate to achieve haemostasis. The other 54 patients either presented with spurter from anterior septum (26%), posterior bleed (4%), granuloma on anterior septum (6%), raw anterior septum (13%), and deviated nasal septum with spur (4%). Out of these 100 patients, 55 were treated with single modality and 45 were treated with multiple modalities.

Patients who presented with pack in situ, out of 46, only 6 were treated with single modality i.e. the bleeding stopped only with packing and there was no need for any other intervention. But 40 patients (88.9%) needed another modality to control the bleed either septal cauterisation or endoscopic sphenopalatine artery ligation.

ii. SITE OF EPISTAXIS:

100 subjects were divided on the basis of the site of epistaxis: either anterior or posterior. 47 patients had anterior bleed whereas 53 patients had posterior bleed.

In the anterior bleed group, 72.7% were treated with single modality in contrast to only 27.3% with posterior epistaxis. 15.6% of anterior epistaxis was treated with multiple modalities as opposed to 84.4% of patients presenting with posterior epistaxis. This was found to be significant with p- value = 0.01. Therefore, according to our study as the chances of posterior epistaxis increased, there was need to include multiple interventions as bleeding could not be stopped by single modality.

- **Treatment Modalities:**

In our study, if bleeding persisted after applying pressure for 15 minutes, nasal packing was adopted as the therapeutic option. Nasal packing is frequently employed when the source of bleeding cannot be identified through anterior rhinoscopy or if the bleeding obstructs the visualisation of the bleed site.

46 patients presented to us either in emergency or in out-patient department. Packing was removed after 48 hours of insertion and the patient was observed for any recurrent bleed following which the bleeding site was localised. Depending on the site of bleed, either septal cauterisation or sphenopalatine artery ligation was undertaken.

Klotz et al[65] emphasises that the failure rate of anterior-posterior (AP) packing shows considerable variation in the literature, ranging from 0% to 52%. This method is highly uncomfortable and entails significant risks. Besides the pain involved in packing the nose, one often experiences nasal obstruction, gagging, difficulty swallowing (dysphagia), and extreme facial pressure during the duration of packing, leading to discomfort during hospitalization.

Moreover, major complications such as septicaemia, arrhythmia, hypoxia, and even death have been linked to antero-posterior packing.

In our study, the success rate of nasal packing was only 18%. Rest had to be managed coupled with other modalities.

In the 100 patients presenting with epistaxis, the various treatment modalities included were:

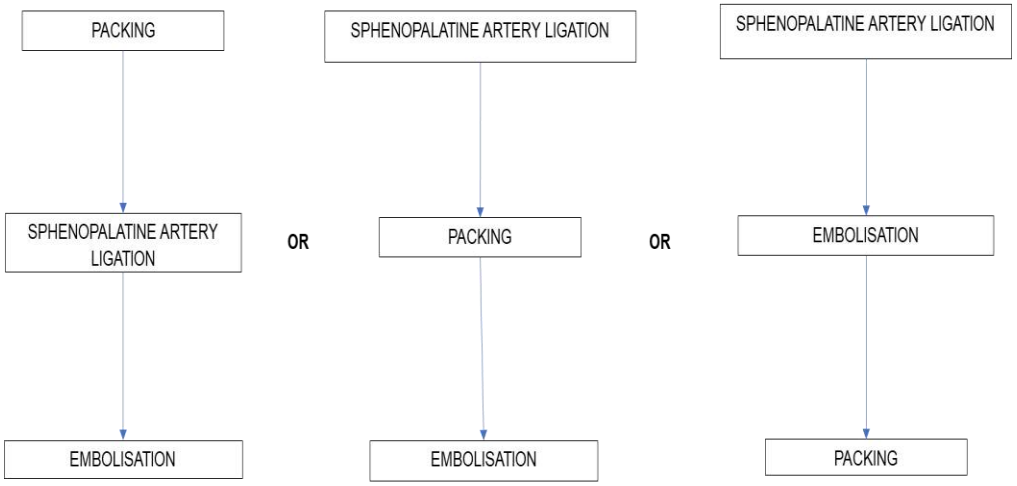
Only nasal packing (18%), septal cauterisation alone (25%), primarily sphenopalatine artery ligation (12%), nasal packing followed by septal cauterisation (7%), and nasal packing followed by sphenopalatine artery ligation (38%).

We documented that the most successful modality was nasal packing followed by sphenopalatine artery ligation (38%) followed by septal cauterisation (25%). Nasal packing followed by septal cauterisation (7%) and nasal packing (18%) were less successful intervention.

NASAL PACKING/ SPHENOPALATINE ARTERY LIGATION > SEPTAL CAUTERISATION > NASAL PACKING > SPHENOPALATINE ARTERY LIGATION > NASAL PACKING/ CAUTERY

Our subjects with posterior bleed mostly presented with pack in situ that necessitated sphenopalatine artery ligation later. Only 15.6% of anterior bleed had to be treated with multiple modalities. The rest 72.7% were treated with only single modality which was usually cauterisation on the septum.

The results coincide with Leung et al[60] model where employing Packing- Sphenopalatine artery ligation - Embolization, Sphenopalatine artery ligation -Packing-Embolization, and Sphenopalatine artery ligation - Embolization- Packing strategies for management pose lower risks compared to strategies where embolization is the initial intervention. This is largely because embolization carries a relatively high risk of stroke.



Our study stands corrected on model of Packing-Sphenopalatine artery ligation, which was the most applied strategy in our study groups. The findings of this risk assessment study, conducted by Leung et al[60] which relies on modelling, can be integrated with evidence on cost-effectiveness to aid clinicians in making informed decisions regarding the management of stubborn epistaxis. In order to balance the factors of cost-effectiveness and risk, they suggested a therapy hierarchy where the main intervention is sphenopalatine artery ligation.

This corroborates with our experience where most of the posterior epistaxis had to be treated either with sphenopalatine artery ligation as a primary intervention or was taken up as secondary intervention after nasal packing in intractable epistaxis.

An economic analysis by Dedhia et al.[61] reported that it was economically viable to directly undertake transnasal sphenopalatine artery ligation once subjects are stabilized with a posterior pack, in lieu of extended posterior packing.

Barnes et al[29] suggests that when contrasted with conventional packing methods, sphenopalatine artery ligation has been demonstrated to lead to shorter hospital stays, enhanced patient satisfaction, and cost savings.

The optimal timing for sphenopalatine artery ligation, considering both patient outcomes and healthcare costs, remains a subject of debate. Lakhani et al.[82] introduced the Wexham criteria, a set of guidelines aimed at aiding in patient selection and timing for sphenopalatine artery ligation. In essence, the Wexham criteria include: posterior nasal packing performed by an ENT specialist or equivalent, necessity of blood transfusion or a decrease in haemoglobin by more than 0.4 g/dL, recurrent epistaxis (more than three episodes) requiring repeated packing during hospitalization, and recurrent hospital admissions for epistaxis (more than three episodes in a three-month period).

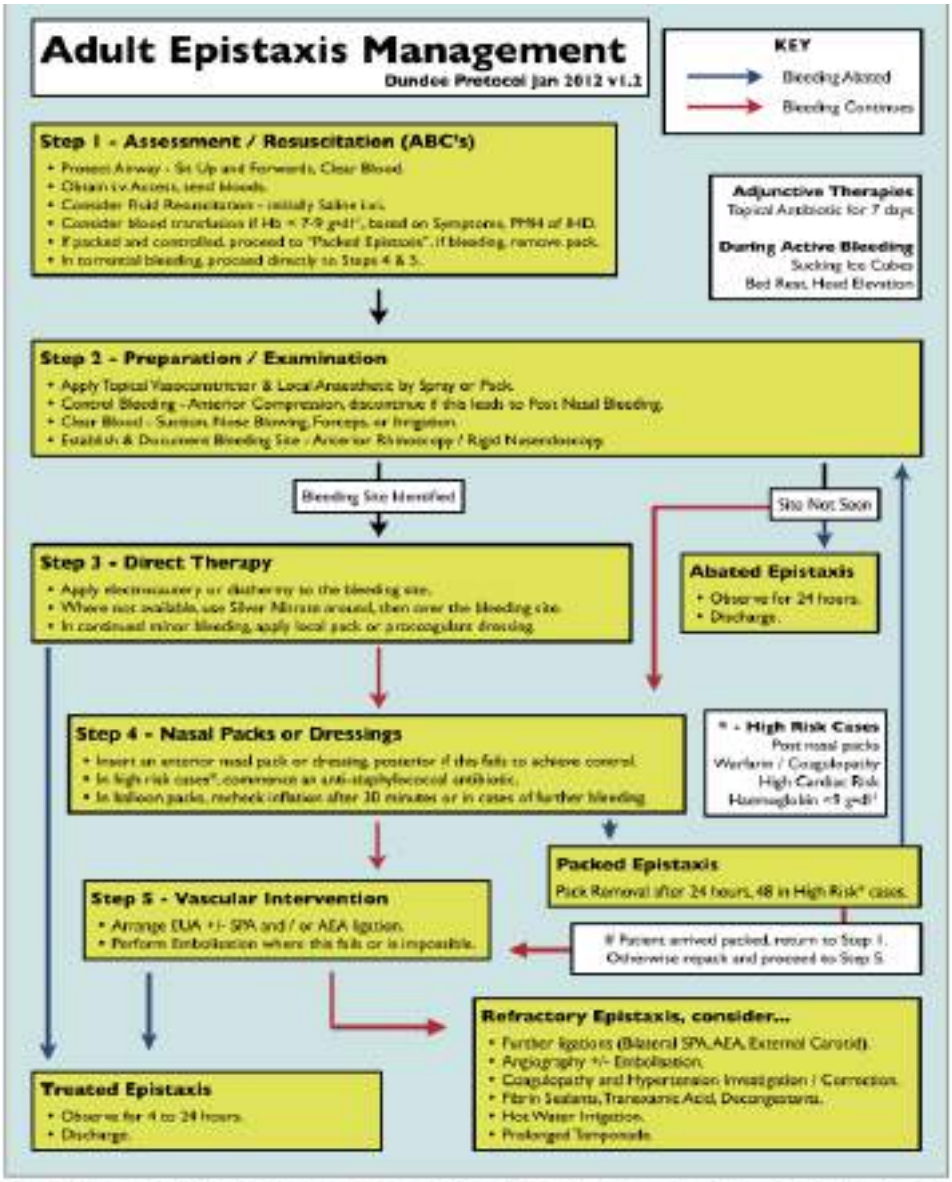
We also implied the criteria as most of the pack in situ were treated by surgical intervention. We also implied sphenopalatine artery ligation for patients who had intractable posterior epistaxis and also had history of recurrent admissions for epistaxis. Most of the patients who needed blood transfusion (1 patient for single intervention and 3 for multiple) were treated with sphenopalatine artery ligation or nasal packing followed by sphenopalatine artery ligation.

In our study, the best modality to bleed was found to be sphenopalatine artery ligation. Our findings can be backed up by various studies conducted for the same. According to Ismi et al[67], transnasal sphenopalatine artery ligation is suggested for cases of bleeding that persist even after initial nasal packing or for patients experiencing posterior epistaxis following packing removal within 48–72 hours. Alternatively, sphenopalatine artery ligation application without prior nasal packing is another approach for posterior epistaxis. When posterior nasal packing is applied for posterior epistaxis, the likelihood of recurrent bleeding ranges from 26% to 52%, with a success rate lower than that of sphenopalatine artery ligation. Compared to posterior packing, sphenopalatine artery ligation offers advantages such as reducing hospital stay, expenses, and enhancing quality of life.

With respect to anterior epistaxis, most were treated with single modality- septal cauterisation (25%), or multiple - with nasal packing followed by septal cauterisation (7%).

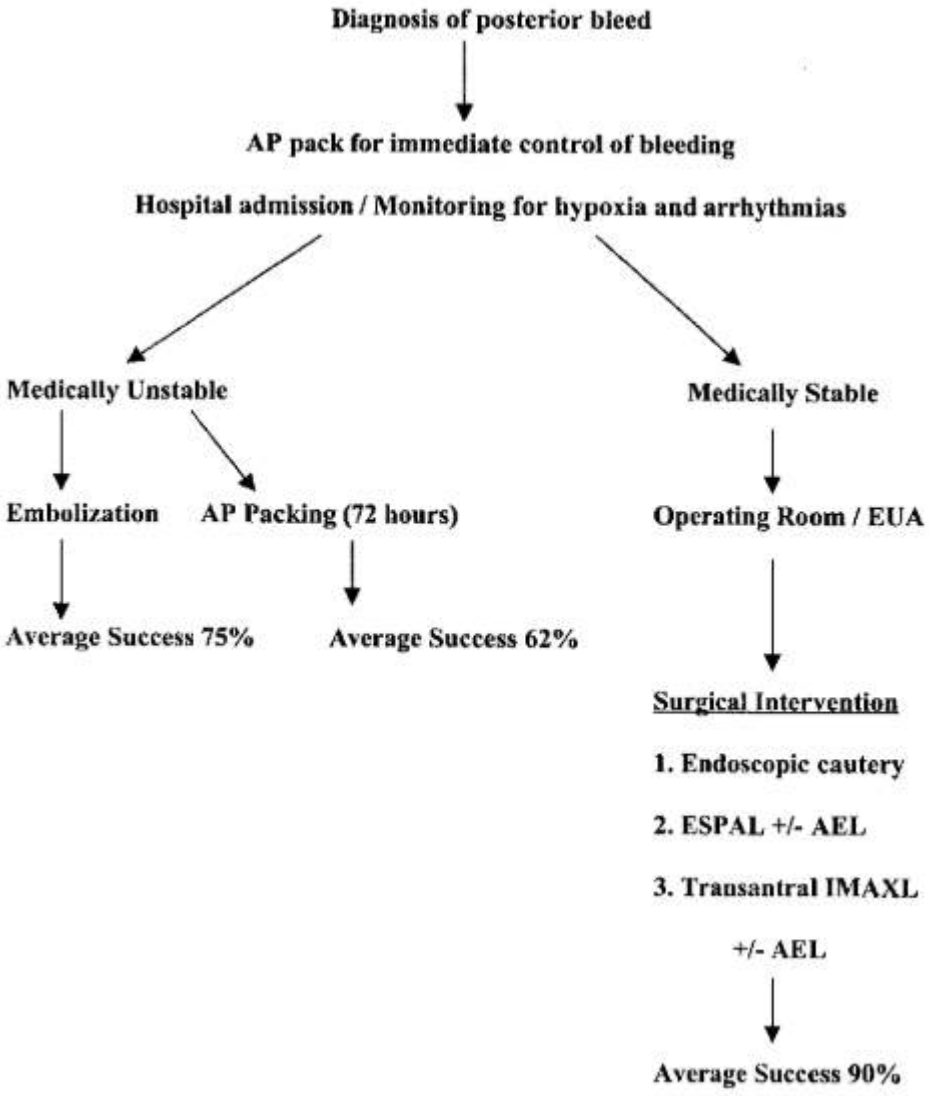
Study conducted by Krulewitz et al[10] suggested cautery, either electrical or via silver nitrate, is associated with greater rates of treatment success and lower pain scores than anterior nasal packing. In our study we used bipolar cauterisation to stop the bleed at the power of 10 W for 3- 5 seconds of contact time.

Bilateral cauterisation was avoided due to the risk of septal perforation. Most bleeds were identified from Kiesselbach's plexus with raw septum. 7% of anterior bleeds came with pack in situ which was removed and bleeder was identified and cautery was done accordingly.


Adult Epistaxis Management
Dundee Protocol Jan 2012 v1.1
KEY
Bleeding Abated
Bleeding Continues
Step 1 - Assessment / Resuscitation (ABC's)
Adjunctive Therapies
Topical Antibiotic for 7 days
During Active Bleeding
Sucking Ice Cubes
Bed Rest, Head Elevation
Step 2 - Preparation / Examination
Bleeding Site Identified
Site Not Seen
Step 3 - Direct Therapy
Abated Epistaxis
• Observe for 24 hours.
• Discharge.
Step 4 - Nasal Packs or Dressings
* - High Risk Cases
Post nasal packs
Warfarin / Coagulopathy
High Cardiac Risk
Packed Epistaxis
Pack Removal after 24 hours, 48 in High Risk* cases.
Step 5 - Vascular Intervention
• Arrange EUA +/- SPA and / or AEA ligation.
• Perform Embolisation where this fails or is impossible.
Refractory Epistaxis, consider...
• Angiography +/- Embolisation.
• Fibrin Sealants, Tranexamic Acid, Decongestants.
• Hot Water Irrigation.
Treated Epistaxis
• Observe for 4 to 24 hours.
• Discharge.

Adult epistaxis management pathway. BID, twice a day; EUA, examination under anesthesia; IHD, ischemic heart disease; AEA, anterior ethmoid artery; SPA, sphenopalatine artery.

Epistaxis management Dundee protocol.[29]



Suggested surgery-based algorithm for management of posterior epistaxis[65] (ESPAL: sphenopalatine artery ligation, AEL: anterior ethmoidal artery ligation, AP packing: antero-posterior packing, IMAXL: internal maxillary artery ligation, EUA: examination under anaesthesia)

- **Follow Up:**

Regarding follow up, patient with epistaxis were followed till 1 month. Regular follow up was done on the 7th day, 14th day and at 1 month. Each modality was categorised based on 3 complications: crusting, bleeding, synechiae. 5 patients did not come to subsequent follow up, after the initial first follow up.

On the first follow-up, out of 100 patients, 35 experienced crusting, with 27 in the single-modality group and 8 in the multiple-modality group. Among the remaining 65 without crusting, 28 received single-modality treatment, while 37 received multiple modalities. Regarding bleeding episodes, 7 patients experienced it, with 6 in the single-intervention group and 1 in the multiple-intervention group. Out of the 93 without bleeding, 49 were treated with single modality, and 44 with multiple modalities. No patients had synechiae at this follow-up.

The follow up findings were based and differentiated upon the common side effects patients faced with these interventions.

On the second follow-up at the 14th day, 23 patients had crusting, with 14 in the single-modality group and 9 in the multiple-modality group. Out of the 72 without crusting, 37 received single-modality treatment, while 35 received multiple modalities. Regarding bleeding, 14 patients had episodes, with 13 in the single-intervention group and 1 in the multiple-intervention group. Out of the 95 patients, 38 were treated with single modality, and 43 with multiple modalities. Ten patients had synechiae at this follow-up, with 4 in the single-modality group and 6 in the multiple-modality group.

On the third follow-up at 1 month, out of 93 patients, 18 had crusting, with 9 in each treatment group. Among the 75 without crusting, 40 received single modality, while 35 received multiple modalities. Regarding bleeding, 14 patients experienced episodes, with 12 in the single-intervention group and 2 in the multiple-intervention group. Out of the 79 without bleeding, 37 were treated with single

modality, and 42 with multiple modalities. Thirty patients had synechiae at this follow-up, with 14 in the single-modality group and 16 in the multiple-modality group. Sixty-three patients had no synechiae, with 35 in the single-treatment group and 28 in the multiple-treatment group.

In the follow up groups, on first follow up, the least crusting was seen with nasal packing followed by nasal packing and sphenopalatine artery ligation. The p- value here is 0.01 which is significant.

There was no bleed in patient who had undergone Nasal packing/Sphenopalatine artery ligation (0%) as well as Sphenopalatine artery ligation (0%) followed by septal cauterisation (1%) and septal cauterisation/nasal packing (1%). Here the p- value is 0.02 which is significant.

There was no synechiae formation on the first follow up. This data suggests that the least complications were present with sphenopalatine artery ligation and nasal packing/ sphenopalatine artery ligation, therefore this becomes the preferred modality.

Kruletwitz et al[10] noted that anterior nasal packing frequently leads to notable discomfort for the patient and can result in enduring side effects. He found that 8% of individuals who underwent cautery experienced long-term pain, while 26% of those who underwent nasal packing reported significant pain. Common adverse effects of nasal packing encompass nasal crusting and compromised breathing.

Kindler et al[41] revealed a recurrence rate of epistaxis of 37% within one year after nasal packing, with 40% of episodes occurring within one week after discharge and 50% necessitating a second treatment.

In our study, surgery seems to be superior to nasal packing. Patients who underwent both treatments spontaneously

expressed their desire for earlier surgery, citing the unpleasantness of pain and swelling resulting from conservative treatment.

On second follow up, at day 14, no crusting was seen with nasal packing (0%), followed by sphenopalatine artery ligation (n=2). The p-value here is 0.01 which is significant. It denotes that at 2 weeks follow up, nasal packing causes no crusting followed by sphenopalatine artery ligation.

The bleeding episodes at day 14 were least with nasal packing/ sphenopalatine artery ligation (0%) followed by sphenopalatine artery ligation (1%). Maximum bleeding was seen in patients who were treated with nasal packing alone (n=7) which required another intervention to control the bleed. P-value is 0.01 which is significant.

At day 14, synechiae were present with Nasal packing/ sphenopalatine artery ligation followed by sphenopalatine artery ligation. Here p-value is 0.205 which is not significant.

Kindler et al[41] enumerates the side effects as follows: Chemical or electrical cautery is a simple, effective, and cost-efficient intervention for treating anterior epistaxis. However, prolonged or repeated cauterization can lead to septal perforation as a main long-term side effect. Packing is frequently employed as the initial treatment for posterior epistaxis but is linked to increased patient morbidity and complications. These complications include sinusitis due to sinus ostia obstruction, mucosal and cartilage necrosis from pressure, otitis media, and in rare cases, toxic shock syndrome.

Thus, at day 14, the best modality with least complications is either sphenopalatine artery ligation or nasal packing/ sphenopalatine artery ligation.

The patients were followed up till 1 month. At 1 month, crusting was seen with septal cauterisation and nasal packing/ sphenopalatine artery ligation. It was seen least with nasal packing

followed by sphenopalatine artery ligation alone. P- value is 0.230 which is non-significant.

Bleeding was seen mostly with patients treated with nasal packing, which indicated to recurrent epistaxis. Therefore, another intervention had to be undertaken to stop the bleed. Only 1 patient had bleeding in follow up treated by sphenopalatine artery ligation, followed by nasal packing/sphenopalatine artery ligation and septal cauterisation. P- value is 0.01 which is significant.

No synechiae formation was seen at 1 month in patients treated with nasal packing as contrast to patients treated with nasal packing/ sphenopalatine artery ligation (n=11). P- value is 0.013 which is significant. This depicts that nasal packing does not cause synechiae formation as opposed to the surgical modalities which have the tendency to form synechiae.

Regarding post bleed with sphenopalatine artery ligation, Ismi et al[67] proposed a two-step cauterization technique involving the separate cauterization of the posterior septal and posterior lateral nasal arteries. While the utilization of hemoclips during sphenopalatine artery ligation appears to elevate costs compared to bipolar cauterization, inadequate coagulation time during cauterization can result in re-bleeding and the persistence of a patent vascular lumen.

In our study, most of the sphenopalatine artery ligation procedures were performed using bipolar cauterisation rather than use of haemoclips, keeping in mind of the cost effectiveness. The rebleeds in our study were quite less leading to more efficient outcomes.

Overall, posterior epistaxis which could not be controlled with packing either anterior or posterior, required surgical intervention. In our study, most of bleed had to be controlled with the help of multiple interventions as single modality was not able to control the bleed. Regarding anterior epistaxis, single modality was required to

control the bleed when bleeding site could be localised. Although most studies assessing sphenopalatine artery ligation are small and retrospective, yet they report an overall success rate of 85%. In a 2003 review by Kumar et al.[88], the pooled success rate was reported as 98%, with an average hospital admission duration of 1.6 days following sphenopalatine artery ligation. An article by Nouraei et al.[89] defined surgical failure as recurrent epistaxis within 2 weeks after sphenopalatine artery ligation and reported a 12% failure rate. They identified several risk factors for early rebleeding requiring nasal packing, including warfarin administration, low platelet count on admission, and not using cauterization for sphenopalatine artery ligation.

GLOBAL LITERATURE ON EPISTAXIS:

STUDY GROUP	NUMBER OF SUBJECTS	TREATMENT	OUTCOME
BISTIANPILLAI ET AL 2019	193	SILVER NITRATE VS BIPOLAR CAUTERISATION	49.5 % USE SILVER NITRATE IN VARIABLE TIME VS 48% USE BIPOLAR CAUTERISATION
HANIF ET AL 2003	18	SILVER NITRATE CAUTERISATION FOR DEPTH OF PENETRATION	SILVER NITATE TO BE APPLIED FOR 5 SEC BUT NO MORE THAN 20 SEC
GLYNN ET AL 2011	101	EFFECT OF 95% CONCENTRATION VS 75% CONCENTRATION OF SILVER NITRATE	IN 75% GROUP, 98% HAD RESOLUTION OF SYMPTOMS, IN 95%, 90% HAD RESOLUTION
VIS ET AL 2011	418	TREATMENT OF EPISTAXIS WITH CAUTERY WITHOUT NEED FOR NASAL PACKING	98% CONTROLLED BY CAUTERY WITH RECURRENCE RATE OF 6%
SOYKA ET AL 2007-2008	678	EFFECTIVENESS OF TREATMENT OPTIONS IN EPISTAXIS	62% SUCCESS RATE WITH NASAL PACKING IN POSTERIOR EPISTAXIS VS 97% BY SURGERY
UPILE ET AL 2008	60	MANAGEMENT OF EPISTAXIS PATIENTS PRESENTING TO EMERGENCY	ANTERIOR NASAL APCKING CAN BE DONE BY NON ENT SPECIALISTS
CHANDLER ET AL 1965	21	TRANSANTRAL LIGATION OF IMA	EFFECTIVE, SIMPLE METHOD USED FOR INTRACTABLE POSTERIOR EPISTAXIS
LEUNG ET AL 2015	ANALYSIS MODELED FOR 50 YR OLD MAN	DEVELOPING A LADDDERED ALGORUTHM FOR MANAGEMENT OF EPISTAXIS	LADDERED APPROACH WITH PREFERRED MODALITY OF SPHENOPALATINE ARTERY LIGATION FIRST, > EMBOLISATION = POSTERIOR PACKING
DEDHIA ET AL 2013	26 ARTICLES USED	COST EFFECTIVENESS OF SPHENOPALATINE ARTERY LIGATION	SPHENOPALATINE ARTERY LIGATION WAS GREATLY EFFICACIOUS (95%) AS COMPARED TO POSTERIOR PACKING (65%)
VOGEL ET AL 1981	85	COMPARISON OF TREATMENT OFR POSTERIOR EPISTAXIS	FAVORED SURGICAL LIGATION AS DIFINITIVE TREATMENT FOR POSTERIOR EPISTAXIS
GANDOMI ET AL 2011-2012	27	ENDOSCOPIC SPHENOPALATINE ARTERY LIGATION FOR REFRACTORY EPISTAXIS	ENDOSCIPIC SPHENOPALATINE ARTERY LIGATION TO BE CONSIDERED AS SECOND LINE MANAGEMENT IF FIRST LINE FAILS
BARNES ET AL 2012	200 ARTICLES REVIEWED	STEPWISE APPROACH TO EPISTAXIS	CHANGING MANAGEMENT FROM TRADITIONAL APPROACHES OR EXTENSIVE PACKING TO ARTERIAL LIGATION

SNYDERMAN ET AL 1999	38	RETROSPECTIVE ANALYSIS FOR USE OF SPHENOPALATINE ARTERY LIGATION	MINOR COMPLICATIONS SUCH AS 34% WITH NASAL CRUSTING, PARAESTHESIA OF PALATE (13%)
KLOTZ ET AL 2002	203	SURGICAL MANAGEMENT OF POSTERIOR EPISTAXIS	SUCCESS RATE: SURGERY (90%) > EMBOLISATION (75%)> AP PAKCING (62%)
SATOSHI ET AL 2003-2007	46	TREATMENT OF SEVERE POSTERIOR EPISTAXIS	65.2% TREATED WITH AP PACKING, 10.9% WITH ELECTROCOAGULATION, AND 23.9% WITH SPHENOPALATINE ARTERY LIGATION
ONUR ET AL 2014-2016	30	SPHENOPALATINE ARTERY LIGATION FOR POSTERIOR EPISTAXIS	SUCCESS RATE WAS 90%, WITH NO RELATION BETWEEN SURGICAL FAILURE AND ANITCOAGULANT USE, HYPERTENSION, PREVIOUS NASAL SURGERY
ABDELKAR ET AL 2003-2005	43	PROSPECTIVE STUDY TO EVALUATE POST OP BLEEDING AFTER SPHENOPALATINE ARTERY LIGATION	4 PATIENTS SUFFERED RECURRENCE REQUIRING FURTHER INTERVENTION - 93% SUCCESS IN PREVENTING RECURRENCE
HOLZMANN ET AL 2003	95	COMPARISON BETWEEN ISOLATED COAGULATION (GROUP A) V/S CUTTING AND COAGULATION (GROUP B) V/S TRANSSECTION AND COAGULATION OF SPHENOPALATINE ARTERY (GROUP C)	REBLEEDING RATES WERE: 21% IN GROUP A, 16.7% IN GROUP B AND 4.3% IN GROUP C
WOOLFORD ET AL 2000	1	ENDOSCOPIC ANTERIOR ETHMOIDAL ARTERY LIGATION	TO BE USED IN SELECTED CASES WHERE BLEEDING IS ETHMOIDAL IN ORIGIN

COMPARISON OF OUR STUDY WITH GLOBAL LITERATURE:

STUDY GROUP	PARENT STUDY	OUTCOME	DMCH STUDY
DEMOGRAPHIC PROFILE:			
MEAN AGE	TUNKEL ET AL[78]	53.4 YEARS	45.38 ± 18.89
SEX (M:F)	KALLENBACH ET AL[79]	1.5:1	1.9:1
RESIDENCE (RURAL: URBAN)	RUHELA ET AL[82]	2.7:1	1.08:1
SIDE OF EPISTAXIS	NOT AVAILABLE	NOT AVAILABLE	R>L (1.12:1)
DURATION OF EPISTAXIS	NOT AVAILABLE	NOT AVAILABLE	12.07± 17.79
COMORBIDITIES:			
DIABETES	LOTH ET AL[85]	NO CORRELATION	NO CORRELATION
HYPERTENSION	MIN ET AL[86]	1.53:1	1.5:1 P-VALUE = 0.025
SMOKING	LI ET AL[87]	NO CORRELATION	NO CORRELATION
ALCOHOL	LI ET AL[87]	P-VALUE: 0.831	NO CORRELATION P-VALUE: 0.427
TREATMENT:			
NASAL PACKING	KLOTZ ET AL[65]	0-52%	18%
SEPTAL CAUTERISATION	LIMBRICK ET AL[90]	93%	68%
ESPAL	DEDHIA ET AL[61]	95%	94.3%

Our research on epistaxis and its therapeutic modalities corroborates with the above-mentioned studies from 1988-2023.

SUMMARY

The present study was conducted on number of patients with epistaxis who presented to Rhinology division of the Oto-Rhino-Laryngology outpatient clinics, and casualty services of tertiary health care facility of North India. This prospective study was undertaken in a period of one year.

The modalities: septal cauterisation, nasal packing, and sphenopalatine artery ligation were employed as either single or sequential multiple modalities.

Epistaxis was predominant in old age, i.e. more than 60 years (24%), commonly in males (66%) and more so was associated with increased systolic as well as diastolic blood pressure (61%), with more from the right side (53%). No correlation was found between the risk factors like smoking, drinking or diabetic status.

Most patients presented with pack in situ which necessitated either sphenopalatine artery ligation or septal cauterisation. Sphenopalatine artery ligation was the preferred modality either as a single intervention or one of the multiple interventions.

Septal cauterisation was the primary modality for anterior epistaxis, either alone or coupled with nasal packing.

Minimal complications were noted with sphenopalatine artery ligation and nasal packing. Unexpectedly in our subjects, nasal packing had least synechiae formation, whereas sphenopalatine artery ligation had minimal of post op haemorrhage or crusting. Crusting was observed in our subjects who underwent septal cauterisation.

The present study noted that the incidence of nasal crusting and lasting complications following epistaxis treatment is notably high, necessitating thorough counselling regarding potential side effects of the treatment and the necessity for ongoing care.

We noted that in posterior epistaxis, it is better to go directly for surgical intervention (sphenopalatine artery ligation), rather than antero-posterior packing which causes more discomfort to the patient, is not cost effective and prolongs the hospital stay.

CONCLUSION

- Epistaxis was predominant in hypertensive males above the age of 60.
- Transnasal Endoscopic Sphenopalatine Artery Ligation was the most preferred modality in anterior as well as posterior epistaxis with the least sequelae.
- Nasal crusting was common in the septal cauterisation modality.

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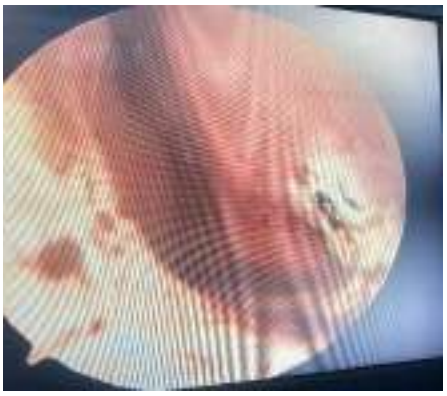
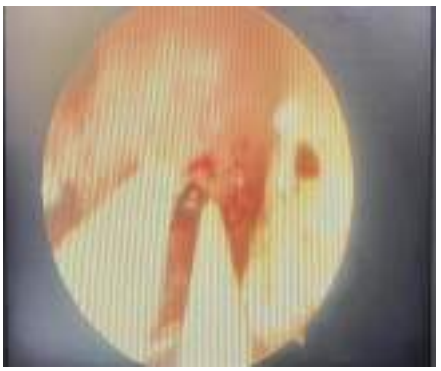
SEPTAL CAUTERISATION:

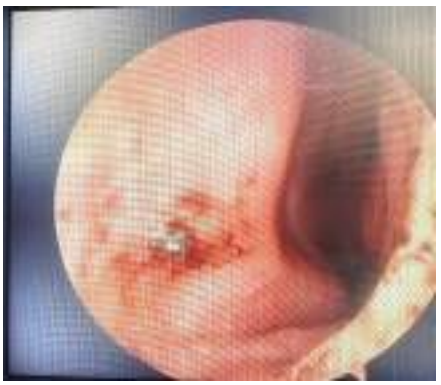
Pt. JS: Right anterior spurter



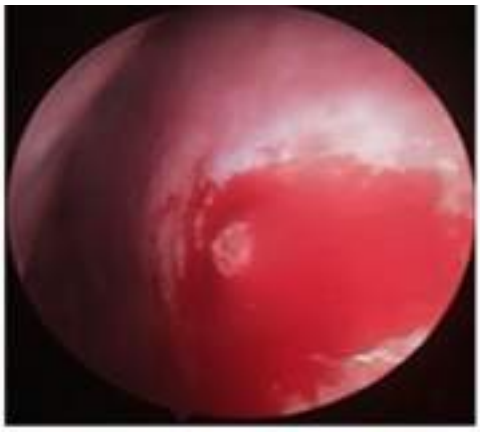
Pt. RS: Left anterior septal granuloma

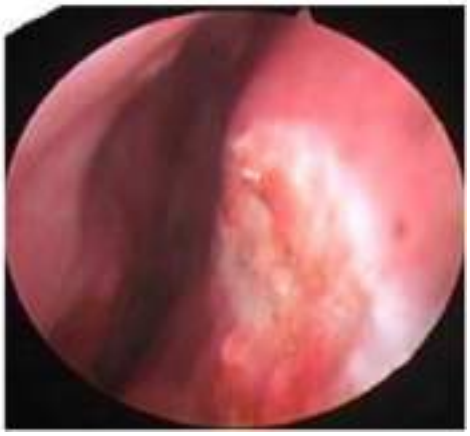


Pt. DS: Left Little's area bleed

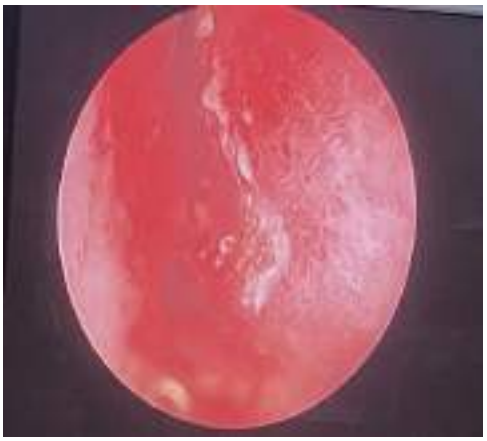


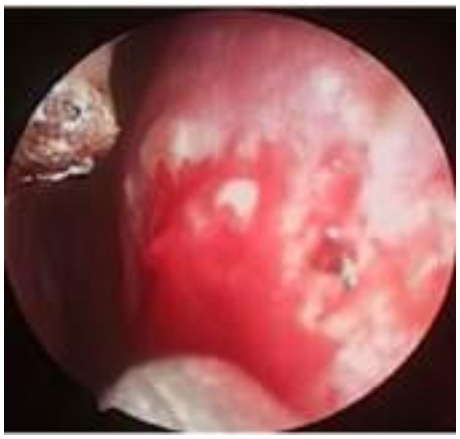
Pt. MK: Right anterior septal spurter



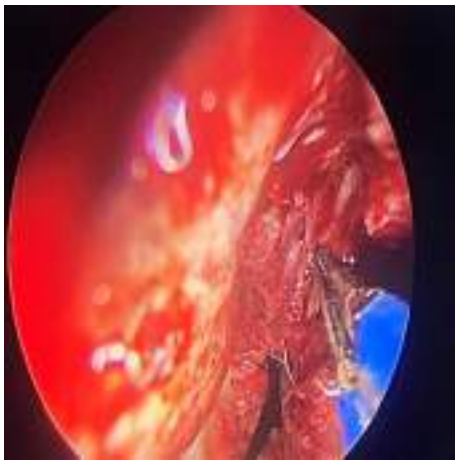


Pt. RG: Right anterior area raw



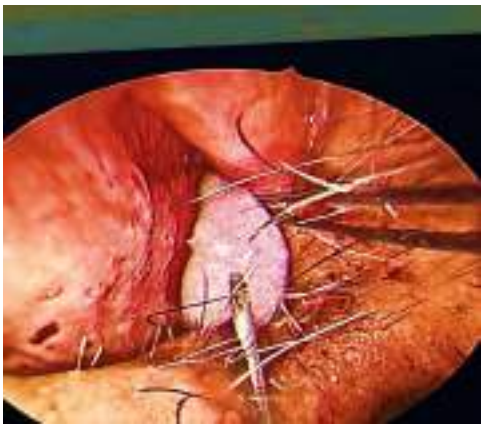


Pt. RK: Left Little's area raw



NASAL PACKING:

MEROCEL PACKING



ANTERIOR GAUZE PACKING

PACK USED IN ANTERIOR EPISTAXIS

PACK IN SITU

ENDOSCOPIC SPHENOPALATINE ARTERY LIGATION:

- INFILTERATION:

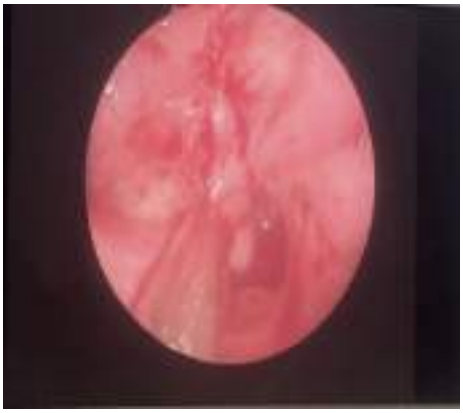
LEFT

Pt. MS

RIGHT

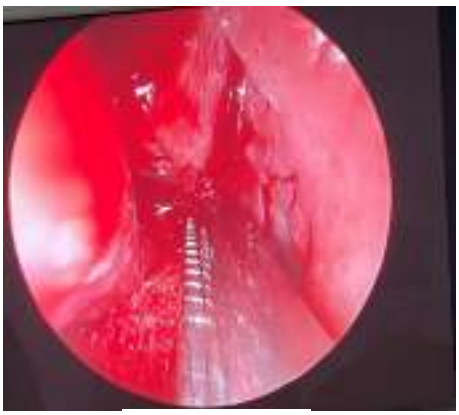
Pt. JS

Pt. KS



Pt. BP

Pt. PK

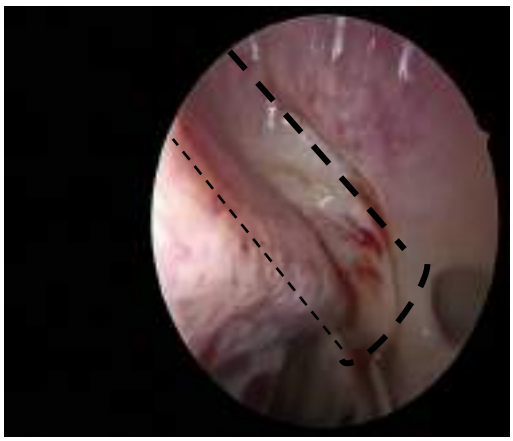


Pt. AS

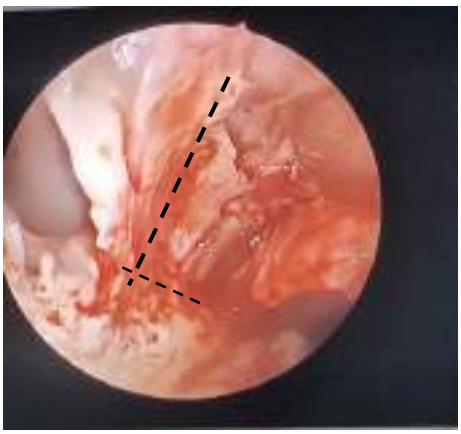
- ‘L’ OR ‘U’ SHAPED INCISION GIVEN:

LEFT

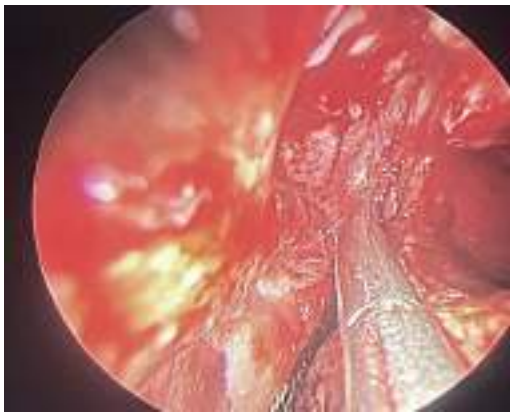
RIGHT



Pt. MS

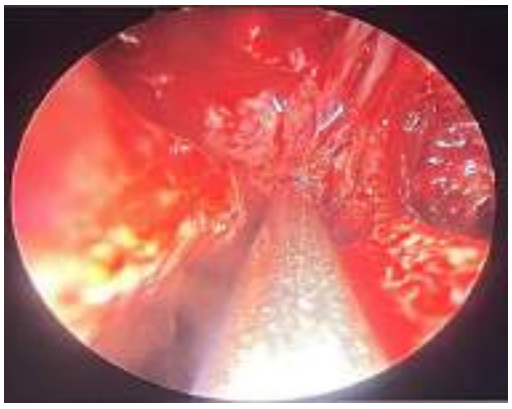


Pt. JS



Pt. KS

Pt. BP



Pt. PK

Pt. AS

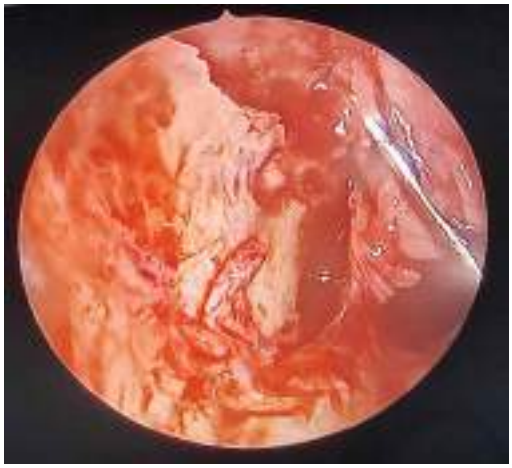
- FLAP ELEVATION:

LEFT

Pt. MS

RIGHT

Pt. JS



Pt. KS

Pt. BP

Pt. PK

Pt. AS

- IDENTIFICATION OF SPHENOPALATINE ARTERY:

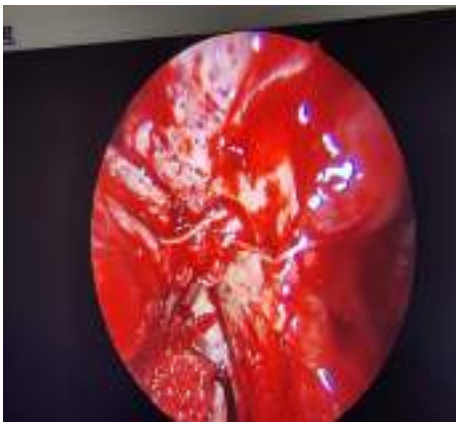
LEFT

Pt. MS

RIGHT

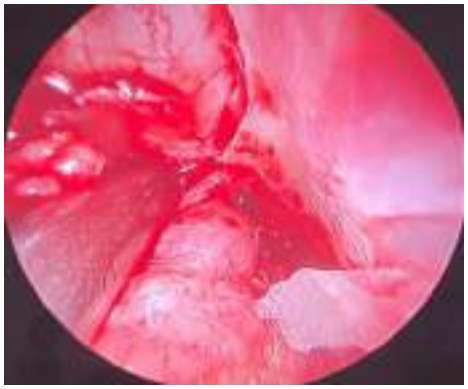
Pt. JS

Pt. KS



Pt. BP

Pt. PK



Pt. AS

- CLIPPING THE SPHENOPALATINE ARTERY:

LEFT

Pt. MS

RIGHT

Pt. VC

Pt. PS

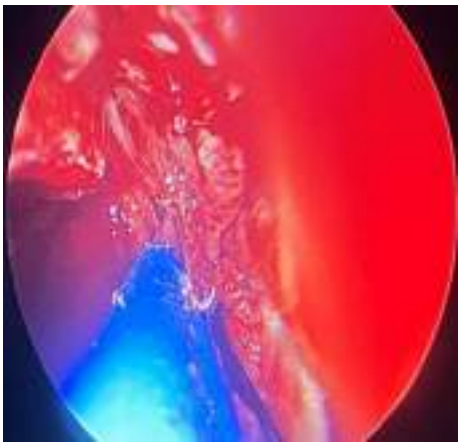
Pt. VD

- COAGULATION OF SPHENOPALATINE ARTERY:

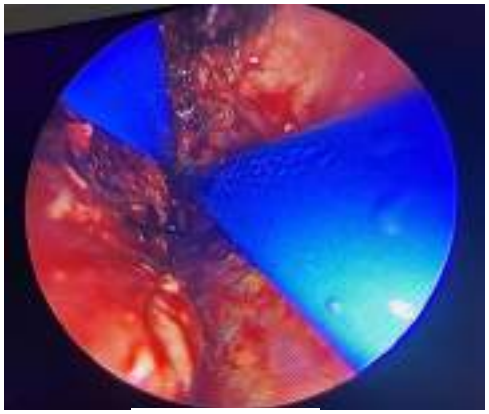
LEFT

Pt. AS

RIGHT

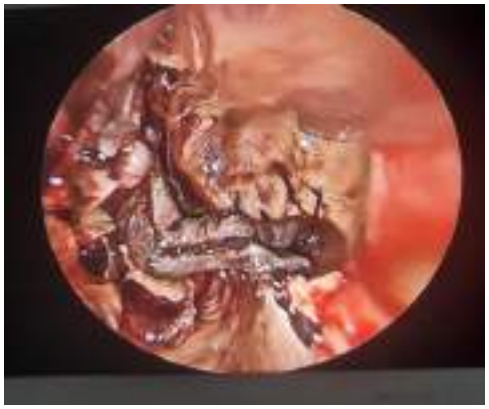


Pt. HS



Pt. BP

Pt. JS



Pt. PK

Pt. KS

- SURGICEL KEPT:

LEFT

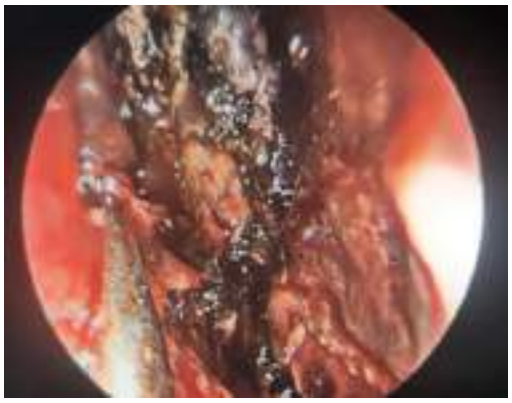
Pt. MS

RIGHT

Pt. JS

Pt. KS

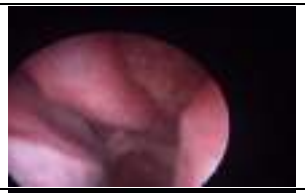
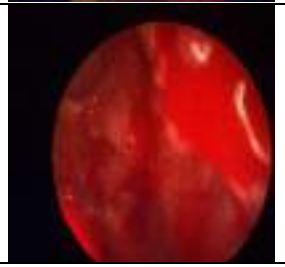
Pt. BP

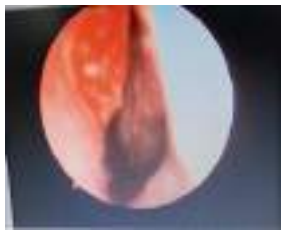
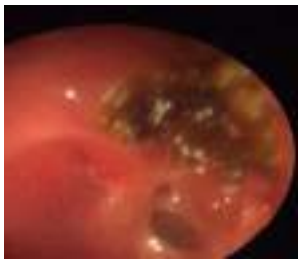
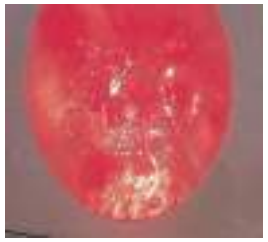
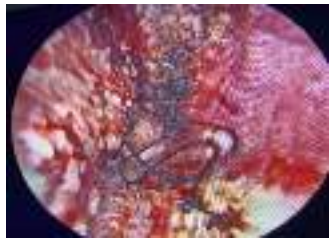
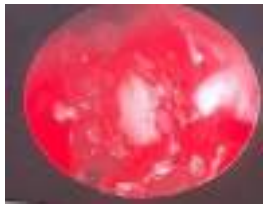
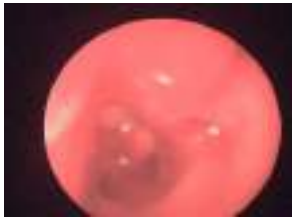


Pt. PK

\

Pt. AS

PATIENT	PRE OPERATIVE	INTRA OPERATIVE	POST OPERATIVE DAY 7	POST OPERATIVE DAY 14	POST OPERATIVE 1 MONTH
SPHENOPALATINE ARTERY LIGATION					
Pt. AS					
Pt. BM					
Pt. MS					
Pt. KK					
Pt. PK					

SEPTAL CAUTERISATION						
Pt. SS					
Pt. JK					
NASAL PACKING						
Pt. HK					
Pt. KK					

S.NO.	MRD NO.	NAME	AGE	SEX	OCCUPATION	ADDRESS	CHIEF COMPLAINTS			DURATION	CO MORBIDITIES		
							EPISTAXIS	NASAL BLOCKAGE	NASAL TRAUMA		DIABETES	HYPERTENSION	CAD
1	1543125	KK	58	F	HOUSEWIFE	RURAL	L	YES	NO	1 MONTH	NO	YES	NO
2	28391	SS	60	F	HOUSEWIFE	RURAL	L	YES	NO	2 WEEKS	YES	YES	NO
3	1035333	RV	68	M	BUSINESS	URBAN	L	NO	NO	1 MONTH	NO	YES	NO
4	1526042	MS	20	M	STUDENT	RURAL	R	NO	YES	2 DAYS	NO	NO	NO
5	1529404	HS	32	M	LABOURER	RURAL	L	YES	NO	5 DAYS	YES	YES	NO
6	1591506	DS	66	M	RETIRED	URBAN	R	NO	NO	7 DAYS	YES	YES	NO
7	1521718	GS	44	F	HOUSEWIFE	RURAL	R	YES	NO	2 WEEKS	NO	YES	NO
8	1581803	SS	59	M	CARPENTER	RURAL	R	YES	NO	1 MONTH	YES	YES	NO
9	1576848	LD	53	M	LABOURER	RURAL	R	YES	NO	2 DAYS	NO	YES	NO
10	1574451	PK	26	M	LABOURER	RURAL	R	YES	NO	2 DAYS	NO	YES	NO
11	1280841	JS	43	M	FARMER	RURAL	L	YES	NO	5 DAYS	YES	YES	NO
12	1525565	UD	22	F	STUDENT	URBAN	R	YES	NO	2 WEEKS	NO	NO	NO
13	1566018	AG	48	M	BUSINESS	URBAN	R	YES	NO	2 MONTHS	YES	YES	NO
14	1580516	HS	16	M	STUDENT	RURAL	R	NO	YES	1 DAY	NO	NO	NO
15	1341384	SD	61	M	FARMER	RURAL	R	NO	NO	2 WEEKS	NO	YES	NO
16	1631841	JS	27	M	COMPUTER TECH.	RURAL	L	YES	NO	1 MONTH	NO	NO	NO
17	1616660	SK	30	F	HOUSEWIFE	RURAL	R	NO	NO	3 DAYS	NO	YES	NO
18	70929	RC	72	M	RETIRED	URBAN	L	YES	NO	7 DAYS	YES	YES	NO
19	1638537	HK	62	F	HOUSEWIFE	RURAL	R	YES	NO	1 MONTH	YES	YES	NO
20	1634424	RK	20	M	STUDENT	URBAN	R	NO	NO	10 DAYS	NO	NO	NO
21	1632788	RK	23	M	GRADUATE	URBAN	R	NO	NO	5 DAYS	NO	YES	NO
22	1633058	RY	35	M	LABOURER	RURAL	L	NO	YES	1 DAY	NO	YES	NO
23	1625645	AK	30	M	LAWYER	URBAN	L	YES	NO	3 DAYS	NO	NO	NO
24	1626390	PM	7	M	STUDENT	RURAL	R	NO	NO	12 DAYS	NO	NO	NO
25	1619849	SS	29	F	HOUSEWIFE	URBAN	L	NO	NO	7 DAYS	NO	NO	NO
26	1646552	MK	33	F	CORPORATE JOB	URBAN	R	NO	NO	2 DAYS	NO	YES	NO
27	1258340	DS	51	M	FARMER	RURAL	L	NO	NO	8 DAYS	NO	YES	NO
28	1612368	LS	26	M	SOFTWARE ENGG	RURAL	L	YES	NO	2 MONTHS	NO	NO	NO
29	1549738	SK	64	M	BUSINESS	URBAN	L	NO	NO	1 MONTH	YES	YES	NO
30	1552804	SK	47	F	HOUSEWIFE	RURAL	L	YES	NO	2 MONTHS	NO	YES	NO
31	1541067	RS	14	M	STUDENT	RURAL	R	YES	NO	2 MONTHS	NO	NO	NO
32	1618556	SS	40	M	SHOPKEEPER	RURAL	L	NO	NO	3 WEEKS	NO	YES	NO
33	1566902	RG	22	M	GRADUATE	URBAN	R	YES	NO	2 MONTHS	NO	NO	NO
34	1534830	PM	54	F	HOUSEWIFE	URBAN	L	NO	NO	1 MONTH	NO	YES	NO
35	1280842	JS	43	M	FARMER	RURAL	R	NO	NO	1 DAY	NO	YES	NO
36	1340021	JS	21	M	STUDENT	URBAN	R	YES	NO	7 DAYS	NO	NO	NO
37	1529424	HS	32	M	CARPENTER	RURAL	L	NO	NO	5 DAYS	NO	YES	NO
38	1526042	MK	22	M	STUDENT	RURAL	L	NO	YES	2 DAYS	NO	NO	NO
39	244606	RK	64	M	POLICE	URBAN	L	NO	NO	5 DAYS	NO	YES	NO
40	1167448	GS	50	M	FARMER	RURAL	L	NO	YES	3 DAYS	NO	YES	NO
41	1292122	KS	85	M	RETIRED	URBAN	R	NO	NO	1 DAY	YES	YES	NO
42	1231626	AD	50	F	HOUSEWIFE	URBAN	R	NO	NO	6 DAYS	NO	YES	NO
43	524859	LS	61	M	BUSINESS	URBAN	L	YES	NO	1 MONTH	NO	YES	NO
44	1222070	AS	61	M	FARMER	RURAL	R	NO	NO	1 DAY	NO	YES	NO
45	1213070	PS	23	M	GRADUATE	URBAN	L	NO	YES	2 DAYS	NO	NO	NO
46	1203334	AK	48	M	LABOURER	RURAL	R	NO	NO	1 MONTH	NO	YES	NO
47	1188926	BM	34	M	LABOURER	URBAN	L	NO	NO	1 DAY	NO	YES	NO
48	1182084	SK	62	F	HOUSEWIFE	RURAL	R	YES	NO	2 MONTHS	NO	YES	NO
49	1158348	GK	34	M	SOFTWARE ENGG	URBAN	L	NO	NO	3 DAYS	NO	YES	NO
50	1277377	MS	60	F	HOUSEWIFE	URBAN	L	NO	NO	3 MONTHS	NO	YES	NO

S.NO.	MRD NO.	PERSONAL HISTORY		GENERAL EXAMINATION		ANTERIOR/POSTERIOR RHINOSCOPY	INVESTIGATIONS			USE OF BLOOD PRODUCTS	EPISTAXIS
		SMOKING	ALCOHOL	PALLOR	BP		Hb	PTI/INR	PLT		
1	1543125	NO	NO	NO	120/80	ACTIVE BLEED	12	10.9/1	218	NO	POSTERIOR
2	28391	NO	NO	YES	140/90	SPURTER LEFT SEPTUM	8.4	11/1.0	466	NO	ANTERIOR
3	1035333	YES	NO	NO	150/90	PACK IN SITU	16.1	11.3/1	244	NO	ANTERIOR
4	1526042	NO	NO	NO	130/80	PACK IN SITU	14.4	12/1.0	297	NO	POSTERIOR
5	1529404	YES	YES	YES	140/90	DNS WITH SPUR	8.3	13.1/1.2	128	NO	ANTERIOR
6	1591506	NO	YES	NO	170/100	ACTIVE BLEED	12.8	10.7/0.98	100	NO	POSTERIOR
7	1521718	NO	NO	YES	160/90	RIGHT RAW LITTLE'S AREA WITH SPUR	10.9	11.5/1.05	400	NO	ANTERIOR
8	1581803	NO	NO	NO	140/100	POSTERIOR BLEED	14	10.9/1	160	NO	POSTERIOR
9	1576848	YES	NO	NO	160/100	PACK IN SITU	14.4	11.1/1.02	329	NO	POSTERIOR
10	1574451	NO	NO	NO	150/100	PACK IN SITU	14.1	10.7/0.98	177	NO	POSTERIOR
11	1280841	NO	YES	NO	140/90	ACTIVE BLEED	11.3	12.6/1.15	310	NO	POSTERIOR
12	1525565	NO	NO	YES	130/90	POSTERIOR BLEED	10.5	12.4/1.14	277	NO	POSTERIOR
13	1566018	NO	NO	NO	130/80	RIGHT SEPTAL SPURTER	11	13/1.19	294	NO	ANTERIOR
14	1580516	NO	NO	NO	130/80	ACTIVE BLEED	11.7	11.7/1.07	205	NO	ANTERIOR
15	1341384	NO	NO	YES	130/80	PACK IN SITU	4.5	14.1/1.29	98000	2 PRBC	POSTERIOR
16	1631841	NO	NO	NO	140/90	LEFT SPUR WITH RAW LITTLE'S AREA	13.1	10.6/0/97	159	NO	ANTERIOR
17	1616660	NO	NO	NO	130/80	PACK IN SITU	11.7	11.9/1	216	NO	POSTERIOR
18	70929	YES	NO	YES	140/100	LEFT SEPTUM RAW	10.1	12.5/1/15	309	NO	ANTERIOR
19	1638537	NO	NO	NO	160/100	RIGHT SEPTAL GRANULOMA	11.1	11.9/1	280	NO	ANTERIOR
20	1634424	YES	NO	NO	150/90	PACK IN SITU	11.1	11.1/1.02	280	NO	POSTERIOR
21	1632788	NO	NO	YES	120/80	PACK IN SITU	8.7	11.7/1.07	381	1 PRBC	POSTERIOR
22	1633058	NO	NO	NO	170/100	PACK IN SITU	11.2	12.1/1.07	380	NO	POSTERIOR
23	1625645	YES	NO	NO	140/100	PACK IN SITU	10.5	11.7/1.1	201	NO	POSTERIOR
24	1626390	NO	NO	NO	100/70	RIGHT LITTLE'S AREA RAW	15.1	13.6/1.24	580	NO	ANTERIOR
25	1619849	NO	NO	YES	130/90	PACK IN SITU	7.4	11.3/1	225	1 PRBC	ANTERIOR
26	1646552	NO	NO	NO	120/80	RIGHT RAW LITTLE'S AREA	12.1	10/0.92	252	NO	ANTERIOR
27	1258340	YES	YES	YES	170/120	PACK IN SITU	9.4	11.4/1.09	110	NO	ANTERIOR
28	1612368	NO	NO	NO	130/80	LEFT RAW AREA WITH SPUR	12.1	12.1/1.01	190	NO	ANTERIOR
29	1549738	NO	YES	YES	160/100	LEFT SEPTAL GRANULOMA	10.9	9.9/0.91	330	NO	ANTERIOR
30	1552804	NO	NO	NO	150/100	PACK IN SITU	11.8	11.3/1/04	285	NO	POSTERIOR
31	1541067	NO	NO	NO	100/60	SPUR TO RIGHT	15.4	11.4/1.05	232	NO	ANTERIOR
32	1618556	YES	NO	NO	160/90	PACK IN SITU	11.1	13.6/1.24	198	NO	ANTERIOR
33	1566902	NO	NO	NO	150/90	RAW RIGHT LITTLE AREA	14.9	11.8/1.08	240	NO	ANTERIOR
34	1534830	NO	NO	NO	170/100	PACK IN SITU	12.5	11.7/1.07	150	NO	POSTERIOR
35	1280842	NO	NO	NO	150/100	PACK IN SITU	11.1	12.1/1	310	NO	POSTERIOR
36	1340021	NO	NO	NO	120/80	RIGHT RAW AREA WITH SPUR	15.2	11.6/1.06	254	NO	ANTERIOR
37	1529424	NO	YES	NO	160/100	LEFT SIDE CLOTTED BLOOD	10.3	11.1/1.02	128	NO	POSTERIOR
38	1526042	NO	NO	NO	120/80	PACK IN SITU	14.4	10.9/1.1	297	NO	POSTERIOR
39	244606	YES	YES	NO	160/100	LEFT LITTLE'S AREA SPURTER	14.1	10.6/0.97	188	NO	ANTERIOR
40	1167448	YES	NO	NO	140/90	PACK IN SITU	12.7	12.5/1.15	203	NO	POSTERIOR
41	1292122	NO	NO	NO	170/100	PACK IN SITU	12.1	12.9/1.18	171	NO	POSTERIOR
42	1231626	NO	NO	NO	160/97	PACK IN SITU	12.7	11.1/1/01	356	NO	POSTERIOR
43	524859	YES	YES	YES	140/90	POSTERIOR BLEED	8.2	12.3/1.13	215	1 PRBC	POSTERIOR
44	1222070	NO	YES	NO	140/90	RIGHT SIDE CLOTTED BLOOD	15	11.7/1.07	150	NO	ANTERIOR
45	1213070	NO	NO	NO	120/80	LEFT PACK IN SITU	16	11.3/1.04	273	NO	POSTERIOR
46	1203334	YES	NO	NO	140/90	DNS WITH GRANULOMA RIGHT SIDE	11.2	12.2/1.02	250	NO	POSTERIOR
47	1188926	YES	YES	YES	150/90	PACK IN SITU	9.9	12.9/1.18	363	NO	POSTERIOR
48	1182084	NO	NO	NO	140/90	POSTERIOR BLEED	10.9	12.1/1.1	310	NO	POSTERIOR
49	1158348	YES	NO	NO	160/110	LEFT SIDE CLOTTED BLOOD	16.9	10.8/0.9	210	NO	POSTERIOR
50	1277377	NO	NO	NO	140/90	GRANULOMA LEFT SIDE	12.9	11.1/1.01	250	NO	ANTERIOR

S.NO.	MRD NO.	TREATMENT									
		SEPTAL CAUTERISATION		NASAL PACKING			ESPAL		INTERNAL MAXILLARY BR. LIGATION		OTHER
		R	L	R	L	B/L	R	L	R	L	
1	1543125	-	-	-	YES	-	-	YES	-	-	N/A
2	28391	-	-	-	YES	-	-	-	-	-	N/A
3	1035333	-	YES	-	YES	-	-	-	-	-	N/A
4	1526042	-	-	YES	-	-	YES	-	-	-	N/A
5	1529404	-	YES	-	-	-	-	-	-	-	SEPTOTURBINOPLASTY
6	1591506	-	-	-	-	YES	YES	-	-	-	N/A
7	1521718	YES	-	YES	-	-	-	-	-	-	SPURECTOMY
8	1581803	-	-	-	-	YES	-	-	-	-	N/A
9	1576848	-	-	-	-	YES	YES	-	-	-	N/A
10	1574451	-	-	-	-	YES	YES	-	-	-	N/A
11	1280841	-	-	-	-	-	-	YES	-	-	N/A
12	1525565	-	-	-	-	-	YES	-	-	-	N/A
13	1566018	-	-	YES	-	-	-	-	-	-	N/A
14	1580516	-	-	-	-	YES	-	-	-	-	N/A
15	1341384	-	-	-	-	YES	YES	-	-	-	N/A
16	1631841	-	YES	-	-	-	-	-	-	-	SPURECTOMY
17	1616660	-	-	-	-	YES	YES	-	-	-	N/A
18	70929	-	YES	-	-	-	-	-	-	-	N/A
19	1638537	YES	-	-	-	-	-	-	-	-	N/A
20	1634424	-	-	YES	-	-	YES	-	-	-	N/A
21	1632788	-	-	-	-	YES	YES	-	-	-	N/A
22	1633058	-	-	-	-	YES	-	-	-	-	NASAL BONE REDUCTION
23	1625645	-	-	-	-	YES	YES	-	-	-	N/A
24	1626390	-	-	YES	-	-	-	-	-	-	N/A
25	1619849	-	YES	-	-	-	-	-	-	-	PREGNANT
26	1646552	YES	-	-	-	-	-	-	-	-	PREGNANT
27	1258340	-	YES	-	-	-	-	-	-	-	N/A
28	1612368	-	YES	-	-	-	-	-	-	-	SEPTOTURBINOPLASTY
29	1549738	-	YES	-	-	-	-	-	-	-	N/A
30	1552804	-	-	-	-	YES	-	YES	-	-	N/A
31	1541067	-	-	YES	-	-	-	-	-	-	N/A
32	1618556	-	YES	-	-	-	-	-	-	-	N/A
33	1566902	YES	-	-	-	-	-	-	-	-	N/A
34	1534830	-	-	-	-	YES	-	YES	-	-	N/A
35	1280842	-	-	-	-	YES	YES	-	-	-	N/A
36	1340021	YES	-	-	-	-	-	-	-	-	SEPTOTURBINOPLASTY
37	1529424	-	-	-	-	-	-	YES	-	-	N/A
38	1526042	-	-	-	YES	-	-	YES	-	-	N/A
39	244606	-	YES	-	-	-	-	-	-	-	N/A
40	1167448	-	-	-	-	YES	-	YES	-	-	N/A
41	1292122	-	-	-	-	YES	YES	-	-	-	N/A
42	1231626	-	-	-	-	YES	YES	-	-	-	N/A
43	524859	-	-	-	-	-	-	YES	-	-	N/A
44	1222070	-	-	YES	-	-	-	-	-	-	N/A
45	1213070	-	-	-	YES	-	-	YES	-	-	N/A
46	1203334	-	-	-	-	-	YES	-	-	-	N/A
47	1188926	-	-	-	-	YES	-	YES	-	-	N/A
48	1182084	-	-	-	-	YES	YES	-	-	-	N/A
49	1158348	-	-	-	-	-	-	YES	-	-	N/A
50	1277377	-	YES	-	-	-	-	-	-	-	N/A

S.NO.	MRD NO.	FOLLOW UP								
		7 DAYS			14 DAYS			1 MONTH		
		CRUSTING	BLEEDING	SYNECHIAE	CRUSTING	BLEEDING	SYNECHIAE	CRUSTING	BLEEDING	SYNECHEAI
1	1543125	NO	NO	NO	YES	NO	NO	YES	NO	YES
2	28391	NO	NO	NO	NO	YES	NO	NO	NO	NO
3	1035333	YES	NO	NO	YES	NO	NO	YES	YES	YES
4	1526042	NO	NO	NO	NO	NO	NO	YES	NO	NO
5	1529404	YES	NO	NO	DID NOT COME FOR FOLLOW UP	-	-	-	-	-
6	1591506	NO	NO	NO	YES	NO	NO	YES	NO	NO
7	1521718	YES	NO	NO	YES	NO	NO	YES	NO	YES
8	1581803	NO	NO	NO	NO	YES	NO	NO	YES	NO
9	1576848	NO	NO	NO	NO	NO	NO	NO	NO	NO
10	1574451	NO	NO	NO	NO	NO	NO	NO	YES	NO
11	1280841	NO	NO	NO	NO	NO	NO	YES	NO	NO
12	1525565	NO	NO	NO	NO	NO	NO	NO	NO	NO
13	1566018	NO	NO	NO	NO	YES	NO	NO	YES	NO
14	1580516	NO	NO	NO	DID NOT COME FOR FOLLOW UP	-	-	-	-	-
15	1341384	NO	NO	NO	NO	NO	NO	NO	NO	YES
16	1631841	NO	NO	NO	YES	NO	NO	YES	NO	NO
17	1616660	NO	NO	NO	YES	NO	NO	YES	NO	YES
18	70929	YES	NO	NO	YES	NO	NO	YES	YES	YES
19	1638537	YES	NO	NO	YES	NO	NO	YES	NO	NO
20	1634424	NO	NO	NO	NO	NO	NO	NO	NO	NO
21	1632788	NO	NO	NO	NO	NO	YES	NO	NO	YES
22	1633058	NO	NO	NO	NO	YES	NO	NO	YES	NO
23	1625645	NO	NO	NO	YES	NO	NO	YES	NO	NO
24	1626390	NO	NO	NO	DID NOT COME FOR FOLLOW UP	-	-	-	-	-
25	1619849	YES	NO	NO	YES	NO	NO	YES	NO	YES
26	1646552	YES	NO	NO	YES	NO	NO	NO	NO	NO
27	1258340	YES	NO	NO	NO	NO	NO	NO	NO	NO
28	1612368	YES	NO	NO	YES	NO	NO	YES	NO	NO
29	1549738	YES	NO	NO	YES	YES	NO	NO	NO	NO
30	1552804	NO	NO	NO	NO	NO	NO	NO	NO	NO
31	1541067	NO	NO	NO	NO	NO	NO	NO	YES	NO
32	1618556	YES	NO	NO	NO	NO	NO	NO	NO	NO
33	1566902	YES	NO	NO	NO	NO	NO	NO	NO	YES
34	1534830	NO	NO	NO	NO	NO	NO	NO	NO	NO
35	1280842	NO	NO	NO	NO	NO	NO	NO	NO	NO
36	1340021	YES	NO	NO	YES	YES	NO	YES	NO	NO
37	1529424	YES	NO	NO	NO	NO	NO	NO	NO	YES
38	1526042	NO	NO	NO	NO	NO	YES	NO	NO	YES
39	244606	YES	NO	NO	YES	NO	NO	NO	NO	NO
40	1167448	NO	NO	NO	NO	NO	NO	NO	NO	YES
41	1292122	YES	NO	NO	NO	NO	NO	NO	NO	NO
42	1231626	NO	NO	NO	NO	NO	NO	NO	NO	NO
43	524859	NO	NO	NO	NO	YES	NO	NO	YES	NO
44	1222070	NO	NO	NO	NO	NO	NO	NO	YES	NO
45	1213070	NO	NO	NO	NO	NO	NO	NO	NO	NO
46	1203334	NO	NO	NO	NO	NO	YES	NO	NO	YES
47	1188926	NO	NO	NO	DID NOT COME FOR FOLLOW UP	-	-	-	-	-
48	1182084	NO	NO	NO	NO	NO	NO	YES	NO	NO
49	1158348	NO	NO	NO	YES	NO	NO	NO	NO	NO
50	1277377	YES	NO	NO	NO	NO	NO	NO	YES	NO

S.NO.	MRD NO.	NAME	AGE	SEX	OCCUPATION	ADDRESS	CHIEF COMPLAINTS			DURATION	CO MORBIDITIES		
							EPISTAXIS	NASAL BLOCKAGE	NASAL TRAUMA		DIABETES	HYPERTENSION	CAD
51	1227782	MP	57	F	HOUSEWIFE	URBAN	L	NO	NO	20 DAYS	NO	YES	NO
52	958896	SR	68	F	HOUSEWIFE	URBAN	R	NO	NO	2 DAYS	NO	YES	NO
53	1142765	PK	53	F	TEACHER	RURAL	R	YES	NO	1 MONTH	NO	YES	NO
54	1122042	RS	51	M	FARMER	RURAL	R	NO	NO	1 DAY	NO	YES	NO
55	1147368	KP	42	M	BUSINESS	URBAN	L	NO	NO	1 DAY	YES	YES	NO
56	683895	BP	69	M	LABOURER	RURAL	L	NO	NO	1 DAY	NO	YES	NO
57	1189286	NK	62	F	HOUSEWIFE	RURAL	L	YES	NO	2 MONTHS	NO	YES	NO
58	1189772	NS	6	M	STUDENT	URBAN	R	NO	NO	7 DAYS	NO	NO	NO
59	1180987	SM	36	M	TEACHER	URBAN	R	YES	NO	4 DAYS	NO	YES	NO
60	1312586	AK	26	F	CORPORATE JOB	URBAN	R	NO	NO	7 DAYS	NO	NO	NO
61	1341470	RS	25	M	GRADUATE	RURAL	L	NO	NO	3 DAYS	NO	NO	NO
62	1381324	RK	25	F	HOUSEWIFE	RURAL	L	NO	NO	2 WEEKS	NO	NO	NO
63	1649352	MS	27	M	CARPENTER	RURAL	L	NO	NO	2 DAYS	NO	YES	NO
64	984625	NR	58	F	HOUSEWIFE	RURAL	R	NO	NO	2 DAYS	YES	YES	NO
65	1555034	SS	18	M	STUDENT	RURAL	R	NO	NO	2 DAYS	NO	NO	NO
66	1645878	JK	23	M	GRADUATE	RURAL	L	NO	NO	7 DAYS	NO	NO	NO
67	1646274	VC	45	M	BUSINESS	URBAN	R	NO	NO	3 DAYS	NO	YES	NO
68	1646258	VK	72	F	HOUSEWIFE	URBAN	R	NO	NO	1 DAY	YES	YES	NO
69	1300840	PK	56	F	HOUSEWIFE	RURAL	L	NO	NO	2 DAYS	NO	YES	NO
70	193974	AD	10	M	STUDENT	URBAN	L	NO	YES	1 DAY	NO	NO	NO
71	1635853	VD	77	F	HOUSEWIFE	RURAL	L	NO	NO	7 DAYS	NO	YES	NO
72	1644332	SS	11	M	STUDENT	URBAN	R	NO	NO	7 DAYS	NO	NO	NO
73	1638258	MS	48	M	FARMER	RURAL	R	NO	NO	2 DAYS	NO	YES	NO
74	833683	DK	56	F	TEACHER	URBAN	R	NO	NO	2 DAYS	NO	YES	NO
75	1639035	PK	55	F	LECTURER	URBAN	R	NO	NO	7 DAYS	YES	YES	NO
76	1642838	VB	70	M	GENERAL PHYSICIAN	URBAN	R	NO	NO	3 DAYS	YES	YES	NO
77	1570587	KM	68	F	HOUSEWIFE	URBAN	R	NO	NO	2 WEEKS	YES	YES	NO
78	1314860	RS	48	M	LAWYER	URBAN	R	NO	NO	5 DAYS	YES	YES	NO
79	1622645	AS	67	M	FARMER	RURAL	L	NO	YES	4 DAYS	NO	YES	NO
80	1628204	KS	58	M	POLICE	URBAN	L	NO	NO	2 WEEKS	YES	YES	NO
81	767553	HK	48	F	HOUSEWIFE	RURAL	R	NO	NO	5 DAYS	YES	YES	NO
82	1629872	AS	38	F	BUSINESS	RURAL	L	NO	NO	5 DAYS	NO	YES	NO
83	1608493	RS	85	M	RETIRED	RURAL	R	NO	NO	5 DAYS	YES	YES	NO
84	1606570	AS	37	M	BUSINESS	RURAL	L	NO	NO	1 DAY	NO	NO	NO
85	1613652	AS	62	M	LABOURER	RURAL	L	NO	NO	7 DAYS	NO	YES	NO
86	1641916	AR	55	F	HOUSEWIFE	RURAL	R	NO	NO	3 DAYS	NO	YES	NO
87	1642357	SK	31	M	BUSINESS	URBAN	R	NO	NO	2 DAYS	NO	YES	NO
88	1642343	HS	45	M	FARMER	RURAL	R	NO	NO	1 DAY	NO	YES	NO
89	1643303	SK	22	M	STUDENT	URBAN	L	NO	YES	2 DAYS	NO	NO	NO
90	1452526	VA	58	M	BUSINESS	URBAN	R	NO	NO	5 DAYS	YES	YES	NO
91	1628872	BS	56	M	BUSINESS	URBAN	L	NO	NO	1 DAY	NO	NO	NO
92	1629314	AS	75	M	RETIRED	RURAL	R	NO	NO	5 DAYS	YES	YES	NO
93	1015883	SB	64	F	NON WORKING	URBAN	R	YES	NO	1 DAY	YES	YES	NO
94	1632118	SR	70	F	HOUSEWIFE	URBAN	R	NO	NO	5 DAYS	NO	YES	NO
95	1632654	MK	60	M	LABOURER	RURAL	L	NO	NO	1 DAY	NO	YES	NO
96	1633510	RK	21	F	HOUSEWIFE	RURAL	L	NO	NO	1 DAY	NO	NO	NO
97	1650032	SK	58	M	BUSINESS	URBAN	R	NO	NO	3 DAYS	NO	YES	NO
98	1651087	RR	57	F	HOUSEWIFE	URBAN	R	YES	NO	1 DAY	NO	YES	NO
99	1669791	DN	42	M	SHOPKEEPER	URBAN	L	NO	YES	1 DAY	NO	YES	NO
100	1251765	KC	55	F	TEACHER	URBAN	L	NO	NO	1 DAY	YES	YES	NO

S.NO.	MRD NO.	PERSONAL HISTORY		GENERAL EXAMINATION		ANTERIOR/POSTERIOR RHINOSCOPY	INVESTIGATIONS			USE OF BLOOD PRODUCTS	EPISTAXIS
		SMOKING	ALCOHOL	PALLOR	BP		Hb	PTI/INR	PLT		
51	1227782	NO	NO	NO	150/90	RIGHT DNS WITH SPUR TO LEFT	11.1	10.9/1	278	NO	POSTERIOR
52	958896	NO	NO	NO	150/100	PACK IN SITU	11.1	11.1/1.01	277	NO	ANTERIOR
53	1142765	NO	NO	NO	140/80	RIGHT ACTIVE BLEED	13.5	11.6/1.06	234	NO	POSTERIOR
54	1122042	NO	YES	NO	160/90	BLEEDER RIGHT ANTERIOR SEPTUM	13	12.1/1.1	400	NO	ANTERIOR
55	1147368	YES	NO	YES	140/100	PACK IN SITU	8.6	13/1.19	205	NO	POSTERIOR
56	683895	YES	YES	NO	160/90	PACK IN SITU	12.1	11.3/1.03	120	NO	POSTERIOR
57	1189286	NO	NO	YES	150/90	LEFT ANT SEPTUM RAW	9.5	10.8/0.99	139	NO	ANTERIOR
58	1189772	NO	NO	NO	100/60	RIGHT SEPTAL GRANULOMA	15.1	13.1/1.2	500	NO	ANTERIOR
59	1180987	YES	NO	NO	130/90	DNS TO RIGHT	14.4	9.4/0.88	150	NO	POSTERIOR
60	1312586	NO	NO	YES	110/80	RAW RIGHT LITTLE AREA	8.4	11.5/1.05	240	NO	ANTERIOR
61	1341470	NO	NO	NO	130/90	GRANULOMA LEFT SIDE	12.1	11.4/1.05	171	NO	ANTERIOR
62	1381324	NO	NO	YES	120/90	LEFT SEPTUM INCREASED VASCULARITY	7.2	10.1/1.02	200	1 PRBC	ANTERIOR
63	1649352	NO	NO	NO	130/80	PACK IN SITU	14.7	11.9/1.09	208	NO	POSTERIOR
64	984625	NO	NO	YES	150/90	RIGHT ANTERIOR SEPTUM RAW	7.7	16.1/1.47	152	1 PRBC/ 1 FFP	ANTERIOR
65	1555034	NO	NO	YES	120/70	RAW RIGHT SEPTUM	7.9	15.1/1.9	120	1 PRBC	ANTERIOR
66	1645878	NO	NO	NO	120/90	PACK IN SITU	14.4	11.1/1.02	231	NO	POSTERIOR
67	1646274	YES	NO	NO	170/100	PACK IN SITU	17.4	11.9/1	280	NO	POSTERIOR
68	1646258	NO	NO	YES	140/100	PACK IN SITU	9.2	12.2/1.01	128	NO	ANTERIOR
69	1300840	NO	NO	NO	190/110	PACK IN SITU	10.8	11.5/1.05	268	NO	POSTERIOR
70	193974	NO	NO	NO	90/60	ACTIVE BLEED LEFT SIDE	15.1	11.2/1.01	500	NO	ANTERIOR
71	1635853	NO	NO	NO	190/110	LEFT PACK IN SITU	11.3	11.5/1.05	120	NO	POSTERIOR
72	1644332	NO	NO	NO	90/60	RAW ANTERIOR SEPTUM RIGHT	15.1	9.9/1.01	280	NO	ANTERIOR
73	1638258	NO	YES	NO	180/110	PACK IN SITU	11.1	11.9/1.09	503	NO	POSTERIOR
74	833683	NO	NO	YES	130/90	RIGHT PACK IN SITU	7.4	12.2/1.01	157	1 PRBC	ANTERIOR
75	1639035	NO	NO	NO	130/90	ACTIVE BLEED	11.6	12.3/1.13	230	NO	POSTERIOR
76	1642838	YES	NO	YES	140/70	PACK IN SITU	7.5	14.9/1.36	273	NO	POSTERIOR
77	1570587	NO	NO	YES	140/90	RIGHT PACK IN SITU	8.3	11.3/1.03	152	NO	ANTERIOR
78	1314860	NO	YES	NO	150/90	PACK IN SITU	14.5	10.1/0.91	184	NO	POSTERIOR
79	1622645	NO	YES	NO	140/90	PACK IN SITU	10.8	11.5/1.05	311	NO	POSTERIOR
80	1628204	YES	NO	YES	160/110	SPURTER LEFT SEPTUM	8.6	11.1/1.02	210	NO	ANTERIOR
81	767553	NO	NO	NO	140/90	PACK IN SITU	11.6	10.1/0.91	363	NO	POSTERIOR
82	1629872	NO	NO	NO	150/90	PACK IN SITU	12	10.9/1	209	NO	POSTERIOR
83	1608493	YES	NO	YES	180/110	PACK IN SITU	6.9	10.9/1.09	118	2 PRBC	POSTERIOR
84	1606570	NO	NO	YES	140/90	PACK IN SITU	9.5	11.7/1.07	120	NO	POSTERIOR
85	1613652	NO	YES	NO	160/110	ACTIVE BLEED	10.7	12.5/1.15	215	NO	POSTERIOR
86	1641916	NO	NO	NO	160/90	PACK IN SITU	12.6	11/1.01	166	NO	ANTERIOR
87	1642357	YES	NO	NO	140/90	CLOTTED BLOOD RIGHT SIDE	10.8	14.1/1.3	161	NO	ANTERIOR
88	1642343	NO	NO	YES	140/90	ACTIVE BLEED RIGHT	9.9	11.1/1.01	128	NO	ANTERIOR
89	1643303	NO	NO	NO	140/80	ACTIVE BLEED LEFT SIDE	13.8	12.6/1.15	150	NO	ANTERIOR
90	1452526	YES	NO	YES	150/90	CLOTTED BLOOD RIGHT SIDE	8.4	11.1/1.01	150	NO	POSTERIOR
91	1628872	NO	NO	NO	160/90	PACK IN SITU	10.8	10.8/0.99	120	NO	POSTERIOR
92	1629314	NO	YES	YES	160/110	PACK IN SITU	8	12.1/1.01	234	NO	POSTERIOR
93	1015883	NO	NO	YES	140/90	ACTIVE BLEED RIGHT	9.6	11.1/0.99	146	NO	ANTERIOR
94	1632118	NO	NO	NO	160/90	PACK IN SITU	11.1	12.1/1.2	175	NO	ANTERIOR
95	1632654	YES	YES	NO	190/110	ACTIVE BLEED LEFT SIDE	12.1	12.1/0.9	205	NO	POSTERIOR
96	1633510	NO	NO	NO	140/90	ACTIVE BLEED LEFT SIDE	10.9	11.1/0.92	120	NO	ANTERIOR
97	1650032	YES	YES	NO	190/100	SPURTER RIGHT ANTERIOR SEPTUM	15.5	11.1/1.02	219	NO	ANTERIOR
98	1651087	NO	NO	NO	180/120	ACTIVE BLEED	10.9	10.1/0.91	215	NO	ANTERIOR
99	1669791	YES	NO	NO	140/90	PACK IN SITU	12.4	10.9/1	194	NO	POSTERIOR
100	1251765	NO	NO	NO	150/110	SPURTER LEFT SEPTUM	10.8	11.7/1.07	275	NO	ANTERIOR

S.NO.	MRD NO.	TREATMENT									
		SEPTAL CAUTERISATION		NASAL PACKING			ESPAL		INTERNAL MAXILLARY BR. LIGATION		OTHER
		R	L	R	L	B/L	R	L	R	L	
51	1227782	-	-	-	-	-	-	YES	-	-	SEPTOTURBINOPLASTY
52	958896	YES	-	-	-	YES	-	-	-	-	N/A
53	1142765	-	-	-	-	YES	YES	-	-	-	N/A
54	1122042	YES	-	-	-	-	-	-	-	-	N/A
55	1147368	-	-	-	-	YES	-	YES	-	-	N/A
56	683895	-	-	-	-	YES	-	YES	-	-	N/A
57	1189286	-	YES	-	-	-	-	-	-	-	N/A
58	1189772	YES	-	-	-	-	-	-	-	-	N/A
59	1180987	-	-	-	-	-	YES	-	-	-	N/A
60	1312586	-	-	-	-	YES	-	-	-	-	PREGNANT
61	1341470	-	YES	-	-	-	-	-	-	-	N/A
62	1381324	-	YES	-	-	-	-	-	-	-	PREGNANT
63	1649352	-	-	-	-	YES	-	YES	-	-	N/A
64	984625	YES	-	-	-	-	-	-	-	-	N/A
65	1555034	-	-	YES	-	-	-	-	-	-	N/A
66	1645878	-	-	-	-	YES	-	YES	-	-	N/A
67	1646274	-	-	-	-	YES	-	YES	-	-	N/A
68	1646258	YES	-	-	-	YES	-	-	-	-	N/A
69	1300840	-	-	-	-	YES	-	YES	-	-	N/A
70	193974	-	-	-	YES	-	-	-	-	-	N/A
71	1635853	-	-	-	YES	-	-	YES	-	-	N/A
72	1644332	-	-	YES	-	-	-	-	-	-	N/A
73	1638258	-	-	-	-	YES	YES	-	-	-	N/A
74	833683	YES	-	YES	-	-	-	-	-	-	N/A
75	1639035	-	-	-	-	-	YES	-	-	-	N/A
76	1642838	-	-	-	-	YES	-	-	YES	-	N/A
77	1570587	YES	-	YES	-	-	-	-	-	-	N/A
78	1314860	-	-	-	-	YES	YES	-	-	-	N/A
79	1622645	-	-	-	-	YES	-	YES	-	-	N/A
80	1628204	-	YES	-	-	-	-	-	-	-	N/A
81	767553	-	-	-	-	YES	YES	-	-	-	N/A
82	1629872	-	-	-	-	YES	-	YES	-	-	N/A
83	1608493	-	-	-	-	YES	YES	-	-	-	N/A
84	1606570	-	-	-	-	YES	-	YES	-	-	N/A
85	1613652	-	-	-	-	-	-	YES	-	-	N/A
86	1641916	YES	-	-	-	-	-	-	-	-	N/A
87	1642357	-	-	YES	-	-	-	-	-	-	N/A
88	1642343	-	-	-	-	YES	-	-	-	-	N/A
89	1643303	-	-	-	-	YES	-	-	-	-	N/A
90	1452526	-	-	-	-	-	YES	-	-	-	N/A
91	1628872	-	-	-	YES	-	-	YES	-	-	N/A
92	1629314	-	-	-	-	YES	YES	-	-	-	N/A
93	1015883	-	-	-	-	YES	-	-	-	-	N/A
94	1632118	YES	-	-	-	YES	-	-	-	-	N/A
95	1632654	-	-	-	-	-	-	YES	-	-	N/A
96	1633510	-	-	-	YES	-	-	-	-	-	PREGNANT
97	1650032	YES	-	-	-	-	-	-	-	-	N/A
98	1651087	YES	-	-	-	-	-	-	-	-	N/A
99	1669791	-	-	-	-	YES	-	YES	-	-	N/A
100	1251765	-	YES	-	-	-	-	-	-	-	N/A

S.NO.	MRD NO.	FOLLOW UP								
		7 DAYS			14 DAYS			1 MONTH		
		CRUSTING	BLEEDING	SYNECHIAE	CRUSTING	BLEEDING	SYNECHIAE	CRUSTING	BLEEDING	SYNECHEAI
51	1227782	YES	NO	NO	YES	NO	NO	YES	NO	NO
52	958896	YES	NO	NO	YES	NO	NO	NO	NO	NO
53	1142765	NO	NO	NO	NO	NO	NO	NO	NO	NO
54	1122042	YES	NO	NO	NO	YES	NO	NO	NO	NO
55	1147368	NO	NO	NO	NO	NO	NO	NO	NO	NO
56	683895	NO	NO	NO	NO	NO	NO	NO	NO	YES
57	1189286	NO	NO	NO	YES	NO	NO	DID NOT COME FOR FOLLOW UP	-	-
58	1189772	YES	YES	NO	YES	NO	NO	YES	NO	NO
59	1180987	NO	NO	NO	NO	NO	YES	NO	NO	YES
60	1312586	NO	YES	NO	NO	YES	NO	NO	NO	NO
61	1341470	YES	NO	NO	NO	NO	NO	NO	NO	YES
62	1381324	YES	NO	NO	NO	NO	NO	NO	NO	NO
63	1649352	NO	NO	NO	NO	NO	NO	NO	NO	NO
64	984625	NO	NO	NO	NO	NO	NO	NO	NO	YES
65	1555034	NO	NO	NO	NO	NO	NO	NO	NO	NO
66	1645878	NO	NO	NO	NO	NO	NO	YES	NO	NO
67	1646274	NO	NO	NO	NO	NO	NO	NO	NO	NO
68	1646258	YES	NO	NO	NO	YES	NO	NO	NO	YES
69	1300840	NO	NO	NO	NO	NO	YES	NO	NO	YES
70	193974	NO	NO	NO	NO	YES	NO	NO	NO	NO
71	1635853	NO	NO	NO	YES	NO	NO	NO	NO	NO
72	1644332	NO	NO	NO	NO	YES	NO	DID NOT COME FOR FOLLOW UP	-	-
73	1638258	NO	NO	NO	NO	NO	NO	NO	NO	NO
74	833683	YES	NO	NO	YES	NO	NO	NO	NO	YES
75	1639035	NO	NO	NO	NO	NO	NO	NO	NO	NO
76	1642838	YES	NO	NO	NO	NO	NO	NO	NO	NO
77	1570587	NO	NO	NO	NO	NO	NO	NO	NO	NO
78	1314860	NO	NO	NO	NO	NO	YES	NO	NO	YES
79	1622645	NO	NO	NO	NO	NO	NO	NO	NO	NO
80	1628204	YES	NO	NO	NO	NO	YES	NO	NO	YES
81	767553	NO	NO	NO	NO	NO	NO	NO	NO	NO
82	1629872	NO	NO	NO	NO	NO	NO	NO	NO	NO
83	1608493	NO	NO	NO	NO	NO	NO	NO	NO	NO
84	1606570	NO	NO	NO	NO	NO	YES	NO	NO	YES
85	1613652	YES	NO	NO	NO	NO	YES	NO	NO	YES
86	1641916	YES	NO	NO	YES	YES	NO	NO	NO	YES
87	1642357	NO	NO	NO	DID NOT COME FOR FOLLOW UP	-	-	-	-	-
88	1642343	NO	YES	NO	NO	NO	NO	NO	YES	NO
89	1643303	NO	YES	NO	NO	NO	NO	NO	NO	NO
90	1452526	YES	NO	NO	NO	NO	NO	NO	NO	YES
91	1628872	NO	NO	NO	NO	NO	NO	NO	NO	NO
92	1629314	YES	NO	NO	NO	NO	NO	NO	NO	YES
93	1015883	NO	YES	NO	NO	NO	NO	NO	YES	NO
94	1632118	YES	YES	NO	NO	NO	YES	NO	NO	YES
95	1632654	NO	NO	NO	NO	NO	NO	NO	NO	NO
96	1633510	NO	YES	NO	NO	NO	NO	NO	YES	NO
97	1650032	YES	NO	NO	NO	NO	NO	NO	YES	YES
98	1651087	YES	NO	NO	NO	NO	NO	NO	NO	YES
99	1669791	NO	NO	NO	NO	NO	NO	NO	NO	NO
100	1251765	YES	NO	NO	NO	YES	NO	NO	NO	NO

Baba Farid University
of Health Sciences
Sadiq Road
Faridkot-151 203 (Pb). INDIA.
Phone : 01639-256232,256236
Tele/Fax : 01639-256235
Email – Thesisbfuhs@gmail.com

(74)

No. BFUHS/2K23p-TH/ 64 Date 1/1/24

The Principal
Dayanand Medical College & Hospital
Ludhiana

Subject:: Approval of Plan of Thesis.

This is to inform you that the Faculty of Medical Sciences in its meeting held on 25.09.2023 has approved the plan of thesis of **Lovleen Sandhu**, a student of your college for **MS ENT** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis
Correlation of treatment modalities in patients with epistaxis and its outcomes .

Supervisor	**Co-Supervisor:-**	**Co-Supervisor:-**
Dr, Manish Munjal	Dr. Rohit Verma	Dr. Sanjeev Puri
Prof. & Head	Professor	Asst. Prof.
Dept. of E.N.T	Dept. of E.N.T	Dept. of E.N.T

The student may submit the thesis in triplicate alongwith the plan in triplicate also, to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She may be directed to attach a photocopy of this letter with the forwarding letter while submitting thesis in the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic, if any.

Controller of Examinations

Note :

1. *If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.*

CORRELATION OF TREATMENT MODALITIES IN PATIENTS WITH EPISTAXIS AND ITS OUTCOMES

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MS

IN

OTORHINOLARYNGOLOGY

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

AUGUST, 2022

DR. LOVLEEN SANDHU

DEPARTMENT OF OTORHINOLARYNGOLOGY
DAYANAND MEDICAL COLLEGE AND HOSPITAL
LUDHIANA

ABSTRACT OF PLAN OF THESIS

Title	CORRELATION OF TREATMENT MODALITIES IN PATIENTS WITH EPISTAXIS AND ITS OUTCOMES
For the degree of	MS ENT
Name of the candidate	Dr. Lovleen Sandhu
Supervisor	Dr. Manish Munjal, Professor and Head ENT, DMCH, Ludhiana
Co-Supervisor	Dr. Rohit Verma, Professor Department of ENT, DMCH, Ludhiana Dr. Sanjeev Puri, Assistant Professor, Department of ENT, DMCH, Ludhiana
Institution	Dayanand Medical College and Hospital, Ludhiana
University	Baba Farid University of Health Sciences, Faridkot

Introduction: Most anterior epistaxis originates primarily from the Kiesselbach plexus, whereas posterior epistaxis is less common and originates from branches of the sphenopalatine artery. Risk factors include local trauma, foreign body insertion, substance abuse, neoplasms, inherited bleeding diatheses, or acquired coagulopathies. Modern-day management of epistaxis is a little more sophisticated, with the advent of new products, rigid endoscopes, improved surgical techniques, and arterial embolization

Aim of Study:

1. To study the modality by which epistaxis is controlled.
2. To compare the efficacy of various modalities in control of epistaxis

Materials & methods: In this study patients presenting with epistaxis in out patient clinics or emergency shall be included. These patients shall be managed by either single modality or sequential multiple modalities

Clinical Significance: to study the detailed anatomy of sphenopalatine artery and the ligation or cauterization of the artery in the management of posterior epistaxis.

Keywords: endoscopic sphenopalatine artery ligation; epistaxis; nasal packing; surgical intervention.

(Signature) Candidate	(Signature) Co-supervisor	(Signature) Co-supervisor	(Signature) Supervisor	(Signature) Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled **"CORRELATION OF TREATMENT MODALITIES IN PATIENTS WITH EPISTAXIS AND ITS OUTCOMES"** exist in the Department of ENT at Dayanand Medical College and Hospital, Ludhiana and will be provided to the candidate. We will see that the data being included in the thesis are genuine and is collected by the candidate herself under our supervision and guidance.

Supervisor

Dr. Manish Munjal
Professor and Head
Department of ENT
DMCH, Ludhiana

Co-Supervisor's

Dr. Rohit Verma
Professor
Department of ENT
DMCH, Ludhiana

Dr. Sanjeev Puri
Assistant Professor
Department of ENT
DMCH, Ludhiana

Head of the Department

Dr. Manish Munjal
Professor & Head
Department of ENT
DMCH, Ludhiana

Place : LUDHIANA

Date : 29/9/22

APPROVAL PROFORMA
BY
RESEARCH & ETHICAL COMMITTEE
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA

Name of candidate	LOVLEEN SANDHU
Department	ENT
Topic of Thesis	CORRELATION OF TREATMENT MODALITIES IN PATIENTS WITH EPISTAXIS AND ITS OUTCOMES
Likely date of appearing in PG examination	May/June, 2024
Date of enrollment	7/3/2022
Name of Head of Department	Dr. Manish Munjal
1) Supervisor **2) Co-Supervisor**	Dr. Manish Munjal Dr. Rohit Verma Dr. Sanjeev Puri
Signature of Members of Research Committee with Stamp	**Signature of Members of Ethics Committee with Stamp**
Dr. Harpreet Kaur (Professor & Head, Pathology)	Mr. R K Sharma (Legal Expert)
Dr. Jaspal Singh (Professor & Head, Surgery)	Dr. Ramit Mahajan (Associate Professor, Gastroenterology)
Dr. Dinesh Gupta (Professor & Head, Medicine)	Dr. Anu Sharma (Professor, Anatomy)
Dr. Sandeep Kaushal (Dean Academics & Professor & Head, Pharmacology)	Dr. Sandeep Kaushal (Dean Academics & Professor & Head, Pharmacology)
Dr. Gurpreet S Wander (Vice Principal)	Dr. Gurpreet S Wander (Vice Principal & Professor & Head, Cardiology)
	Dr. Gagandeep Singh (Secretary, Ethics Committee Professor & Head, Neurology)

Approved: Yes / ~~No~~

Dr. Sandeep Puri
Chairperson
Research Committee

Chairperson
Research Committee

Approved: Yes / ~~No~~

Prof. Arvind Malhotra
Chairperson
Ethics Committee

Chairperson
Ethics Committee

BABA FARID UNIVERSITY OF HEALTH SCIENCES,

FARIDKOT

PROFORMA FOR REGISTRATION OF SUBJECT FOR

DISSERTATION

1	NAME OF THE CANDIDATE AND ADDRESS	Dr. Lovleen Sandhu 7-G, Jyoti Nagar, Jalandhar
2	NAME OF THE INSTITUTE	Dayanand Medical College and Hospital, Ludhiana
3	COURSE OF STUDY AND SUBJECT	MS ENT
4	DATE OF ADMISSION OF COURSE	07-03-2022
5	TITLE OF THE TOPIC	CORRELATION OF TREATMENT MODALITIES IN PATIENTS WITH EPISTAXIS AND ITS OUTCOMES

6. BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

Epistaxis is one of the most common medical emergencies, making the management of posterior epistaxis a challenging problem for the ear, nose, and throat (ENT) surgeon. The estimated incidence is 1/1000 population per year.[1] Approximately 60% of the general population will experience an episode of epistaxis in their lifetime, with causes ranging from idiopathic to cancerous lesions.[2,3] Seventy percent of epistaxis cases occur spontaneously.[2] Approximately 6% of patients presenting with epistaxis ultimately require medical or surgical intervention, and less than 0.2% require hospitalization due to epistaxis.[2-3]

Up to 90% of epistaxis cases originate in the Kiesselbach area and are managed with chemical cautery or packing, but 10% of cases originate from the posterior nasal area and require more aggressive treatment.[2] Although posterior nasal packing can be applied in patients with posterior epistaxis, this nasal packing, including balloon tamponade, has a high failure rate, ranging from 26% to 52%.[1,4,5]
This is largely due to the fact that the turbinate prevents direct pressure on the bleeding point, causing the need for repeated blockage. Mucosal traumacauses necrosis and further bleeding, starting a vicious circle.

In addition, it has a high rate of complications (69%), including synechia, sinusitis, lesions in the nasal mucosa, local infections, septal perforation, orbital cellulitis, necrosis of the nasal ala, fracture of the lamina papyracea, perforation of the palate, and alterations in the middle ear.

Other possible complications, although very rare, include pyogenic granuloma, allergy, toxic shock syndrome, obstructive sleep apnea syndrome (OSAS), hypoventilation, chest pain, hypoxia, aspiration (if the tamponade is moved), altered arterial blood gases, bradycardia, hypotension, and infectious endocarditis.[4-6]

Both the morbidity and duration of hospitalization of the patients have been reduced through the transnasal endoscopic sphenopalatine artery ligation (TESPAL) and arterial embolization methods in recent years.[7]

Endovascularapproachesare a viable alternative to surgical intervention for life-threatening nasal hemorrhage, with overall reported success rates of 71% to 100%.[8]

The adjusted length of stay depicted no significant difference between intervention modalities. Patients undergoing ligation or embolization likely have a more severe and refractory nature of their disease. Intuitively, it seems that this should translate into an increased length of stay. However, prior studies,[9] including one small prospective study,[9] have shown that operative or endovascular control actually results in significantly shorter lengths of stay.

Various complications are noted with each treatment modality. Anterior coagulation, whether chemical or electric, is usually performed in surface-anesthesia using soaked cotton pledges. This of course bears the risk of allergic reactions to the local anaesthetic and anaphylaxis, however it can be minimized by obtaining an adequate medical-history.

The addition of epinephrine also creates a small risk of cardiac events.[10] Coagulation, especially when applied on both sides of the septum, may lead to necrosis, synechia, scarring and perforation.[11,12]

Packing, especially when used in posterior bleedings, bears different potentially lethal complications. Upon insertion a naso-vagal reflex can be triggered and lead to cardiac dysfunction.[13] If not secured properly packs can get swallowed or even worse aspirated into the lungs.[14] Securing of the pack on the other hand can lead to alar or columellar necrosis.[15] Colonisation of the tampon may be followed by infections and sometimes although rarely cause toxic shock syndrome.[16]

Last but not least, nasal packs may lead to oxygen desaturation and hypercapnia by nasopulmonary reflex and iatrogenic obstructive sleep apnea and can hereby be lethal in cardio-pulmonary ill patients.[11.17,18] In traumatic cases a Foley catheter can even migrate through the skull base.[19,20]

Complications of sphenopalatine artery closure comprises of the same events as in other endoscopic surgical procedures.

6.2 REVIEW OF LITERATURE

Posterior epistaxis often arises from the posterior septum and the posterior lateral nasal wall, which constitutes 5 to 10% of patients.[7] Due to the difficulties in spotting the location of bleeding, its treatment is more difficult than anterior epistaxis.[7]

Causes of epistaxis include digital trauma, nasal septum deviation, neoplasms and chemical irritants, systemic factors such as coagulopathies, kidney failure, alcoholism, and vascular etiology. [21-22]

SPA arises from SPF as a single artery at a rate of 60 to 80% and then comes off the branches of the posterior septal and posterior lateral nasal branches. However, SPA may arise from SPF in the form of more than a single artery in 20 to 30% of patients.[7] During SPA ligation, the artery should be clipped at the proximal portion as much as possible in order to clip all accessory arteries, if there are any. Crista ethmoidalis is located in the anterior to the foramen in 98% of patients and overlies the SPF. Crista ethmoidalis is a reliable marker to find the SPF and allows the unveiling of the SPF during TESPAL.[7] Although there is usually only one SPF, there may be accessory foramina at the level of CE in 10% of patients and the artery may be passing through these foramina.

The trans-nasal endoscopic approach, in which the artery is ligated while accessing the Vidian nerve, was first introduced in 1976.[23]

Endoscopic SPA ligation is technically straightforward to perform, allowing direct and secure ligation of the major vessel supplying the posterior nasal cavity, while complications associated with pterygopalatine fossa surgery are avoided.[1,24] This technique reduces the potential for intra-orbital and intracranial complications.[1]

Rebleeding can be caused by various factors, including clip dislodgement, the presence of rich collateral vessels, and also the existence of more than one branch at the point of emergence of the SPA from its foramen.

Lee et al. found that the SPA was divided into two major branches in 76% of cases, into three branches in 22% of cases and into four branches in 2% of cases.[25] It is to be noted that the success rate ranged between 70–100%.

Onurİsmi et al found the success rate of TESPAL in posterior epistaxis was 90%. There was no relationship between surgical failure and antiaggregant use, anticoagulant use, hypertension, previous nasal surgery , and bilateral TESPAL application. TESPAL was seen to be effective in cases with Osler–Weber–Rendu disease, pregnancy, and uncontrollable epistaxis after rhinoplasty surgery.[26]

Carl H. Snyderman, et alsuggetsthe decision to ligate the anterior ethmoid artery is based on consideration of the patient's medical status (ability to tolerate longer surgical time or recurrent bleeding) and social status (ability to return quickly to the emergency department in case of re-bleed), as well as the surgeon's preference.[26]

Ha, J. F et al suggests Success rate for anterior nasal packing alone has been reported to be 73%, anterior and posterior packing 69% and NC up to 89–100%.[27]

In a prospective study to investigate the role and relevance of clotting profiles in the management of epistaxis, Jones et al[28] discovered that 48% of 37 patients studied had abnormal clotting profiles. Half of these clotting abnormalities could have been predicted from a routine history, but half could not. Of the 37 patients studied, 1 patient had von Willebr and’s disease and 8 patients were taking warfarin. Of the 8 patients taking warfarin, 2 had international normalized ratio levels above the therapeutic range. In many instances, an episode of epistaxis may be the only indication of an underlying coagulation disorder, the diagnosis of which could lead to the treatment of an otherwise unknown condition and prevention of serious sequelae.

Hey, S. Y., Koo Ng, N. K. F., et al suggest that although embolization has been shown to have equal efficacy to ESPAL in cessation of refractory epistaxis, in our practice, this tends to be reserved in patients with anesthetic concern or rebleed cases. This is, in part, due to the limited availability of embolization which has its own significant risks. Furthermore, ESPAL has been shown to be superior to embolization in terms of cost-effectiveness.[29]

Krajina et al suggests embolisation of the bilateral distal IMAs and ipsilateral distal facial artery with 200-lm PVA microparticlessignificantly decreases short-term failure rates and carries a very low risk for ischemic complications. The rate of early recurrence decreases with embolisation of more arteries. Patients taking oral anticoagulants or antiplatelet medication are noted to have greater rate of early rebleeding than patients not taking these medications.[30]

Packing was advocated for patients in whom basic measures such as application of pressure failed; however, no specific guidance was provided regarding the optimum duration for such measures. Singer et al. specified 15 minutes of pressure followed by a further 15 minutes of pressure after the application of a topical nasal decongestant if epistaxis persisted.[31]

6.3 AIMS AND OBJECTIVES OF THE STUDY

Aim is to:

PRIMARY AIM:

To study the modality by which epistaxis was controlled.

SECONDARY AIM:

To compare the efficacy of various modalities in control of epistaxis.

7. MATERIALS AND METHODS

7.1 Source of Data

In this study patients presenting with epistaxis in outpatient clinics or emergency shall be included. The study will take place over 1.5 year. These patients shall be managed by either single modality or sequential multiple modalities. The various modalities to control epistaxis shall be:

1. Septal cauterization
2. Nasal packing
3. Arterial Ligation(sphenoplalatine/ ethmoidal/ external carotid)
4. Embolisation (internal maxillary artery)

7.2 METHOD OF COLLECTION OF DATA

The following information will be recorded for each patient: age, sex, side of bleeding, visibility of bleeding source (i.e. anterior/posterior epistaxis), number of recurrences, and types of treatments. All patients will be consecutively included.

Persistent bleeding despite treatment within 24 hours was counted as an immediate failure. Re-bleeding within 4 weeks on the same side was considered a recurrence. Bleedings thereafter were counted as new events.

INCLUSION CRITERIA

Includes patients with:

All patients presenting with epistaxis either in emergency, OPD or IPD.

EXCLUSION CRITERIA

1. Thalassemia
2. Neoplasm of nose
3. Patient on Antiplatelets
4. Not consenting for surgery

DURATION OF STUDY

Total patients over the span of 1.5 years will be enrolled in the study.

OUTCOME

Evaluation of success rate of single modality or multiple modalities in the control of epistaxis and to determine the ideal modality.

STATISTICAL ANALYSIS

Data will be described in terms of range, mean±standard deviation (±SD), frequencies (No of cases) and relative frequencies (%age) as appropriate.

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.

Yes, Investigations To Be Conducted In Patients **–**

1. Clinical examination: General physical examination, ENT examination
2. Endoscopy: Diagnostic nasal endoscopy will be done.

7.4 HAS ETHICAL CLEARANCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3?

Yes. Attached herewith.

8. LIST OF REFERENCES

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PROFORMA

IDENITIFICATION DATA

Name : SERIAL NO.

MRD. No.

Age / Gender:

Occupation:

Address:

CHIEF COMPLAINTS **DURATION**

Rhinorrhoea

Sneezing

Post nasal drip

Nasal Trauma

Epistaxis

Nasal obstruction

PAST HISTORY **DURATION**

Diabetes mellitus

Hypertension

Tuberculosis

Bronchial asthma

Weight loss

Treatment history

FAMILY HISTORY

PERSONAL HISTORY **DURATION**

Alcohol Consumption

Smoking

Tobacco chewing

Signature of Supervisor Signature of Candidate

GENERAL PHYSICAL EXAMINATION

Pallor

Edema

Vitals: BP:

Built

LOCAL EXAMINATION

Ear	Left
	Right
Nose	Anterior Rhinoscopy
	Posterior Rhinoscopy

Oral cavity

O.C

O.P

Indirect Laryngoscopy:

Neck

MANAGEMENT:

1. Septal cauterization
2. Nasal packing
3. Arterial Ligation(sphenoplalatine/ ethmoidal/ external carotid)
4. Embolisation (internal maxillary artery)

Signature of Supervisor Signature of Candidate

INVESTIGATIONS:

- HMG: Hb: TLC: PLT:
- RFT: urea: creat: Na: K: Cl:
- Bleeding profile: PTI:

  INR:
- Use of blood products:

- XRAY PNS (___/__/_____)(wherever possible)
- DIAGNOSTIC NASAL ENDOSCOPY (_____/_/_____) (wherever possible)

PROVISIONAL DIAGNOSIS:

TREATMENT GIVEN:

SURGICAL METHOD:

FOLLOW UP ENDOSCOPY(wherever possible):

Signature of Supervisor Signature of Candidate

INFORMED PATIENT CONSENT

Date: _____

I…….D/o, W/o, S/o……..…… am willing to participate in the study **"CORRELATION OF TREATMENT MODALITIES IN PATIENTS WITH EPISTAXIS AND ITS OUTCOMES"** The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

……. ……
Signature of the Witness Signature of the patient

Name:

Signature of Candidate **Signature of Supervisor**

मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____

निवासी _____

इस शोधकार्य "**CORRELATION OF TREATMENT MODALITIES IN PATIENTS WITH EPISTAXIS AND ITS OUTCOMES"** में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____	_____
गवाह के हस्ताक्षर	रोगी के हस्ताक्षर/अंगूठे का निशान
नाम:	नाम:

_____

अन्वेषक के हस्ताक्षर

_____

विद्यार्थी के हस्ताक्षर

ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____

ਵਾਸੀ _____

“CORRELATION OF TREATMENT MODALITIES IN PATIENTS WITH EPISTAXIS AND ITS OUTCOMES” ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

_____ _____

ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ_____ ਮਿਤੀ_____

ਪਤਾ _____ ਪਤਾ _____

_____

ਨਿਰੀਖਕ ਦੇ ਹਸਤਾਖਰ

_____

ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ